

INTEGRATED FISHERIES MANAGEMENT

2014/2015 POST SEASON REVIEW



COMMERCIAL PLAN FOR ROE HERRING

ROE HERRING – Appendix 7

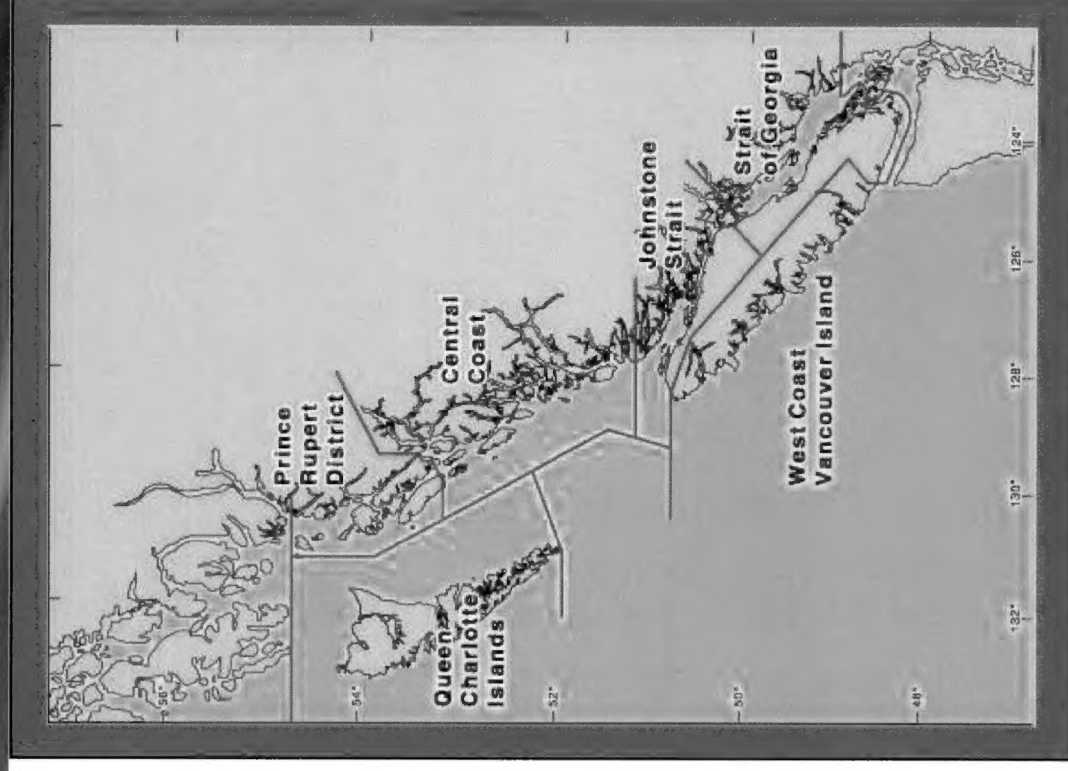
2015 Season Review



INTRODUCTION:

- Resources
- Stocks and spawn (where available)
- Commercial fisheries: seine and gillnet

1. Strait of Georgia
2. West Coast Vancouver Island
3. Central Coast
4. Prince Rupert
5. Haida Gwaii





COASTWIDE OVERVIEW

Assessment Programs

- **Test sample collection and dive surveys:** Coastwide contract between DFO and the Herring Conservation Research Society, and AFS Central Coast program.
- **First Nations charters and coordinator** programs in several areas of the coast.
- **Fishery Monitoring Program:** JO Thomas & Associates: provides dockside catch validation, and at sea observers for seine and gillnet fisheries. (Funded by industry).

2015 HERRING SCIENCE SUMMARY FOR PACIFIC REGION

Summary of biosamples by SAR for the past 5 seasons (test + all commercial samples):

Season	HG	PRD	CC	SOG	WCVI	Area 27	2West
20101	13	56	30	108	28	3	10
20112	9	48	24	144	10	7	5
20123	12	44	15	122	5	6	7
20134	12	32	26	93	4	0	3
20145	11	51	20	159	20	0	4

Location	# of flights	Start	End	Observed spawn distance
		Recon		
		charter		
HG				Location (nm)*
				HG 29.4
PRD	7	21/03/2015	24/04/2015	PRD 60.6
CC	12	17/03/2015	17/04/2015	CC 116
SOG	28	23/02/2015	12/04/2015	SOG 77.0
WCVI	11	25/02/2015	08/04/2015	WCVI n/a

Test Vessels

Location	Type	Vessel	Contract		Total	
			Days	Start	End	Days
HG	Test	Queens Reach	25	09/03/2015	02/04/2015	25
	Dive	Lasqueti Explorer	25	29/03/2015	22/04/2015	25
	Reconn	Victoria Rose	13	27/03/2015	18/04/2015	20
PRD	Test	Nita Maria	13	15/03/2015	28/03/2015	13
	Test	Franciscan 1	13	15/03/2015	30/03/2015	13
	Dive	Royal Pride	20	30/03/2015	18/04/2015	20
CC	Test	Kwiaahwah	20	15/03/2015	03/04/2015	20
	Test	Mary Isle	11	26/03/2015	05/04/2015	11
	Dive	Kynoc	21	07/04/2015	27/04/2015	21
	Dive	Ocean Cloud	11	30/03/2015	09/04/2015	11
SOG	Test	Denman Isle	27	24/02/2015	26/03/2015	31
	Dive	Ocean Cloud	13	08/03/2015	20/03/2015	13
	Dive	Viking Spirit	21	08/03/2015	03/04/2015	21
WCVI	Test	Mary Isle	15	24/02/2015	10/03/2015	15
	Dive	Pachena 1	25	10/03/2015	03/04/2015	25
WCVI, SOG,						
Area 27	Dive	Seaveyors	15	25/02/2015	20/04/2015	19

Roe Herring Overview: 2015

- New for 2014/2015, roe seine licence holders had the option to select harvest in the SOG and PRD food and bait fisheries instead of the roe seine fishery during the roe herring area selection process.
- The initial food and bait allocations increased after the roe seine licence holders had completed their applications and area selections and opt to harvest in the food and bait fishery.
- The SOG roe fishery seine allocation was reduced by the same amount that the food and bait fishery quota was increased.



QUOTA AND CATCH CALCULATIONS – short tons

ALL SEINES

- Total number of licences: 252
- Total seine quota: 19,840 tons
- Total seine catch: 10,780.529 tons
- Percent of total seine fishery catch: 67% of total coastwide roe catch.

ALL GILL NETS

- Total number of licenses: 1266
- Total gillnet quota: 16,775 tons
- Total gillnet catch: 5,199.91 tons
- Percent of total gill net fishery catch: 33% of total coastwide roe catch.

ALL GEAR

- Total Quota for 2015: 36,615 tons
- Total Catch for 2015: 15,980.44 tons
- Percent of total roe fishery catch: 44%

Strait of Georgia - Resources

- CCGC Management Platform Neocaligus – Mar 1 to 20
- Dive charters Viking Spirit, Ocean Cloud, and shared shore based platform.
- Test vessel: Denman Isle
- 29 spawn aircraft flights.
- DFO funded First Nations Fisheries Coordinator.



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Strait of Georgia – Stocks and Spawn

Maximum Soundings:

- 75,000 - Estimate based on test vessel soundings only

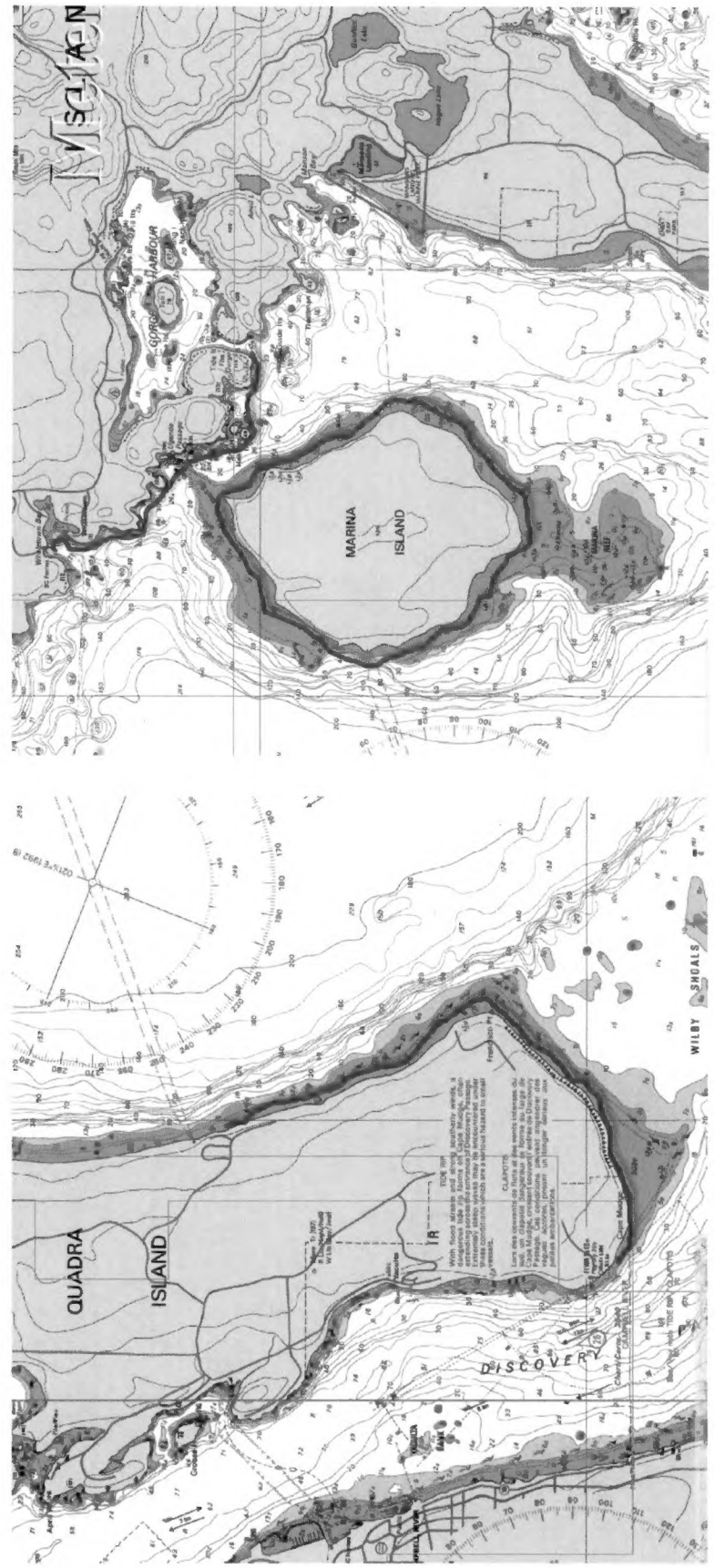
Observed Spawn:

- First spawn Feb 23 Fillongly
- 74 linear nautical miles recorded by aircraft (62 in 2014, 94 in 2013)

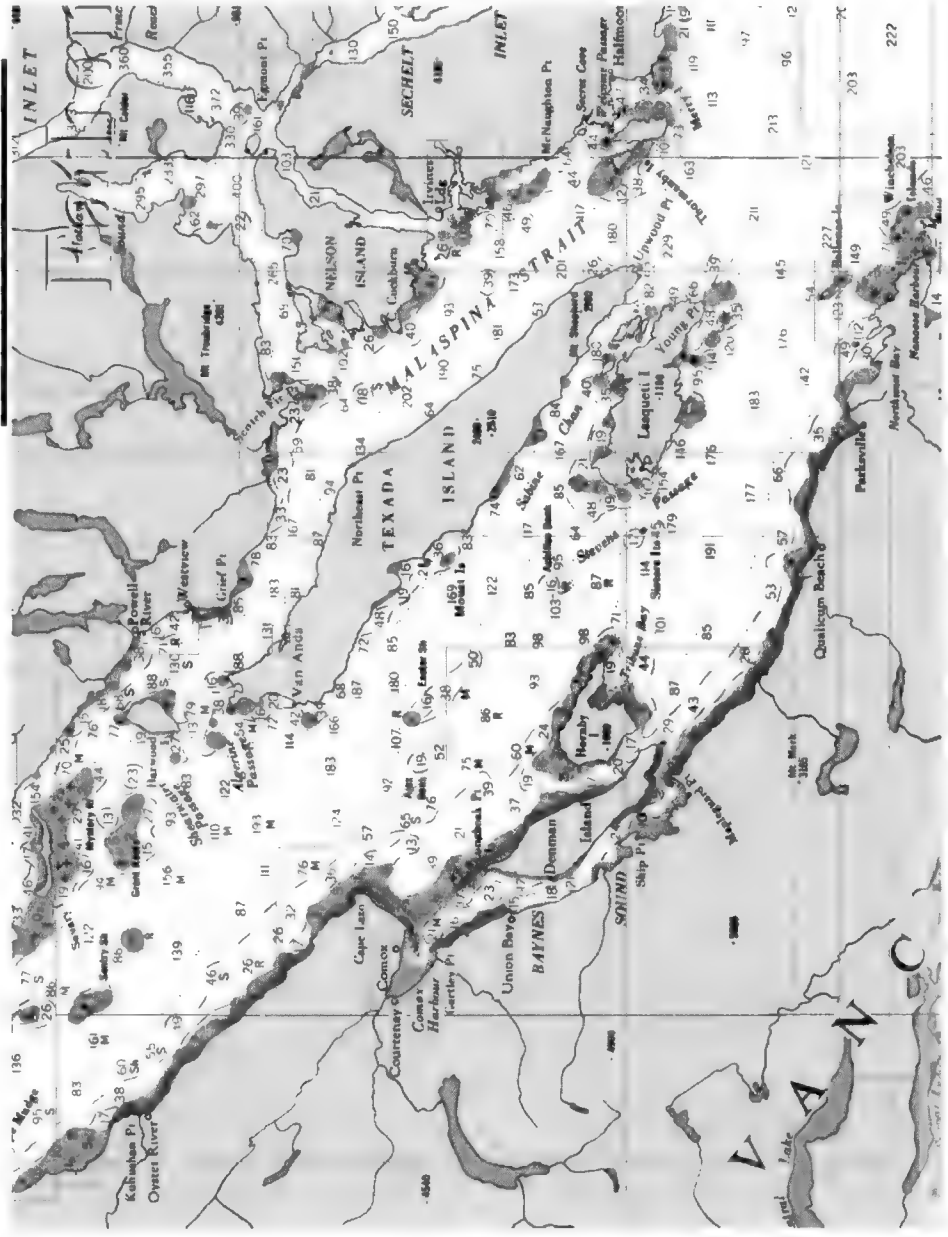


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Area 13 - March 7 to March 15



Area 14 to 16



Areas 14 : 48NM
Feb 23 to Apr 6

Area 15 : 1.5NM March 17

Area 16: 0.3NM
March 5

Strait of Georgia – Seine Fishery



- **Quota:** 15,440 short tons
- **Catch:** 9,278.169 short tons
- **Number of licences:** 216 average,
71.481 tons per licence, 9 licensed pools
- **Fishing Dates:** Feb 24 and 28; Mar 1, 2,
3, 4, 12, 13, 18, 26, 30; April 2 and 6.
Closed April 10, 2015.

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Strait of Georgia – Seine Fishery Fishing Dates and Catch

Table 1. 2015 STRAIT OF GEORGIA SEINE
FISHING AREA, CATCH, AND EFFORT, BY DATE

DATE	PFMA	# SETS	# SETS WITH FISH	# SETS KEPT	AVE SET SIZE	END OF DAY HAILED CATCH	VALIDATED CATCH (TONS)
24-Feb-15	17-18	1	1	1	75	75	71
28-Feb-15	14-8	26	18	8	207	1,658	2,093
1-Mar-15	14-5,14-8	20	11	2	25	50	82
2-Mar-15	14-5, 14-8	34	25	14	205	2,874	3168
3-Mar-15	14-5,14-8	21	13	8	104	834	963
4-Mar-15	14-5, 17-12	18	14	5	36	180	286
12-Mar-15	14-1 to 14-3	24	16	12	111	1328	1636
13-Mar-15	14-1 to 14-3	31	16	5	52	260	275
18-Mar-15	14-2	1	1	1	140	140	148
26-Mar-15	14-2	3	1	1	105	105	104
30-Mar-15	17-13	2	1	1	180	180	193
2-Apr-15	17-18, 17-19	6	2	2	63	125	121
6-Apr-15	17-12	1	1	1	140	140	136
Totals		188	120	61	130	7,949	9,278

Strait of Georgia – Seine Fishery

- Notable for a protracted season, with poor quality fish (size and roe percentage).
- The high TAC, lack of build-up of good quality fish.
- Lack of a comprehensive test program contributed to the difficulties this season.
- Concurrent roe quality and non-roo quality fishing, and the sea lion interference in testing and fishing made things more challenging this year.
- The ASO program was used more extensively than in previous years, and the limitations of the program in terms of availability of staff and deployment were apparent.



Strait of Georgia – Gillnet Fishery



- Gill net Quota: 13975 tons
- Gill net Catch: 4107.043 tons
- 22 Pools, 1028 Licenses, Quota per license 13.594 tons.
- 11 Pools with Validated Catch
- No Pool Achieved quota
- Gillnet Fishery Opening:
- 14:30 hrs Feb 28, 2015 to 16:00 hrs April 8, 2015





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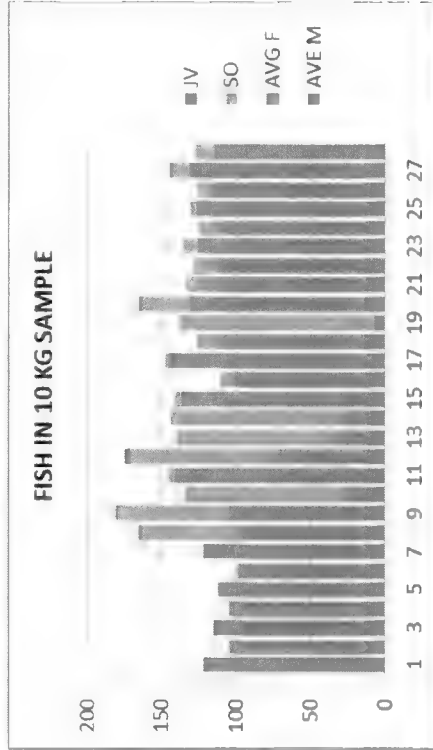
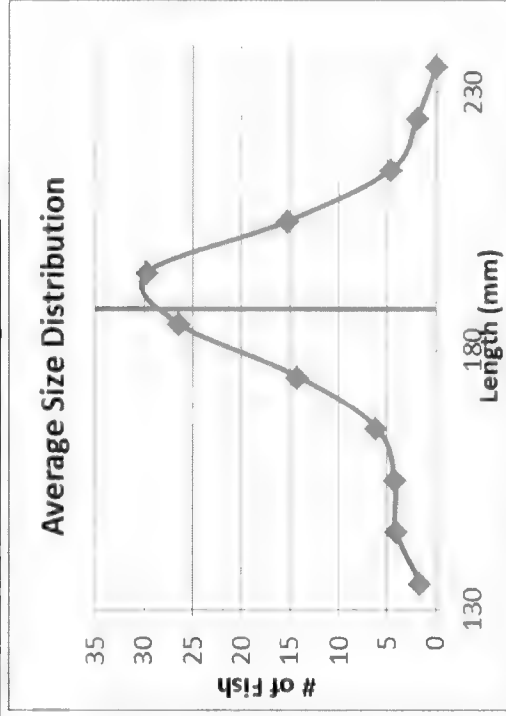
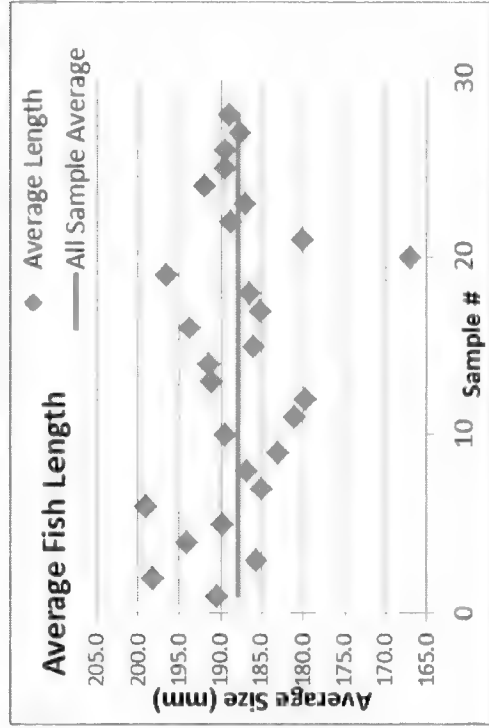
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Strait of Georgia – Gillnet Fishery

- Main portion Feb 28 – Mar 8: Hornby/Denman Island in the North to French Creek in the South. Most of the catch was taken between Mar 2 and Mar 6 in the Mapleguard Point to Big Qualicum area.
- Secondary Mar 16 – Mar 23: eastern side of Gabriola from Silva Bay in the South to Lock Bay in the North and on the Vancouver Island shoreline from Neck Point in the South to Icarus Point in the North.



Denman Isle: in season deck samples



- Samples high to males
- 188 mm ave length

WCVI RESOURCES

- Seine Test vessel: Mary Isle (15 days)
- Combination test & dive survey: Pachena No. 1 (25 days)
- Combined WCVI/SOG/Area 27 shore based dive survey team (19 days combined).
- First Nations charters in Area 23, 24 and 25.

WCVI Seine

- Quota: 2,000 short tons
- Catch: 0 tons
- Number of licences: 7 licences, 1 licensed pool
- Fishing Dates: March 8-9, Area 25 Esperanza
- At sea observers required.

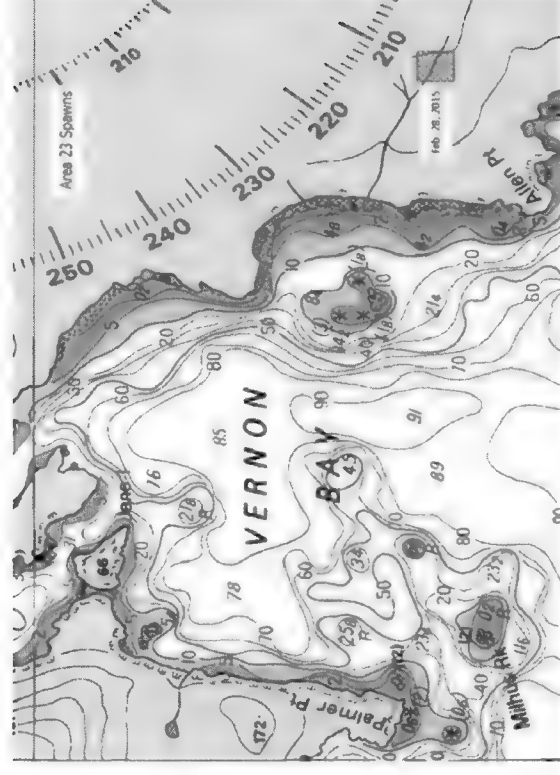


WCVI Seine

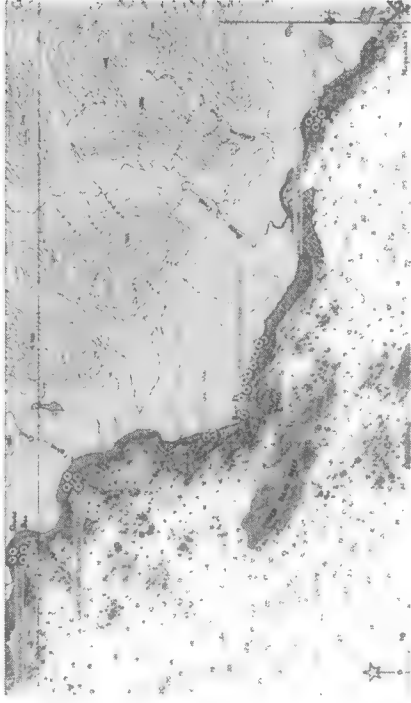
- Seven catcher vessels and one packer in WCVI on March 7th. Prior to arriving on the fishing grounds, the pool captain requested Area 23 to be opened on March 7th - roe quality was unacceptable.
- Two vessels with at-sea observers were designated under scientific licence to test and collect biological samples from Area 25.
- The spawn timing was a week or two early, with the seine fleet arriving too late for viable fishing opportunities.
- No catch in area 25.

WCVI

- Gillnet: No fleet in the area, no openings requested.
- Spawn locations: Area 23



Area 25 Spawn





Central Coast-Resources

Charter Vessels:

- Sounding Charters (AFS funded)– 14 days
 - 3 Girls II (March 15 – 28)
 - Royal Jazz (March 22 – April 4)
 - Sarah Nadia(March 29 – April 11)
- Test Charter (AFS funded) – 21 days Kwiaahwah (March 15 – April 4)
- Management Platforms: CCGS Arrow Post, CCGS Vector, Mary Isle
11 days



Central Coast-Stocks and Spawn

- Soundings during the middle of March identified the largest abundances:
 - Seaforth Channel
 - Lower Spiller Channel
 - Upper Spiller Channel
 - Kildidt Sound.
- Abundances of herring were also identified in Laredo Sound within Kitasu Bay and around Hastings Island at the end of March.
- 116 nm of spawn was surveyed by the dive charters



Central Coast-Seine Fishery

- Number of Licenses: 9
- Quota: 800 tons
- Catch: 689.908 tons
- Open: 16:48 hours March 22, 2015 PFMA 7-14. (Spiller Channel)
- Closed: 11:30 hours March 23, 2015



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Central Coast-Gillnet Fishery

- Number of licences: 60
- Quota: 600 tons
- Catch: 0
- Open: 12:00 hours March 31, 2015 PFMA 6-16.
- Closed: 20:00 hours March 31, 2015



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Prince Rupert – Stocks and Spawn

Program Resources Overview:

- Test vessel Franciscan No.1 for 13 days: March 15-29
- Testing platform Nita Maria/ 13 days (Big Bay)
- Dive charter Royal Pride for 20 days (shared with Big Bay)
- 7 spawn flights
- Gitxaala First Nation spawn survey contract



Prince Rupert - Seine Fishery

- Seine Quota: 800 tons
- Catch: 812.452 tons
- Number of licences: 8; 100 tons per licence;
- 1 industry pool
- Fishery opening: 07:53 hrs March 21 to 21:38 hrs March 23, 2015
- Areas open: PFMA 5-4, 5-5, and portions of 5-8 & 5-9





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Prince Rupert - Gillnet Fishery

Quota: 1,200 tons

Catch: 1,092.869 tons

Number of Licenses: 125

Quota per licence: 9.6 tons

Fishery opening: Open: 08:00 hours March 22, 2015

Closed: 16:30 on Friday, March 27

Areas open: PFMA 4-5, 4-6, 4-7, 4-8, 4-9 and 4-14.

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Prince Rupert - Gillnet Fishery

- Resource manager and assistant manager on grounds
- Approximately 60 nautical miles of total spawn was observed throughout the Big Bay area not including Hunts Inlet or Butlers Cove.
- Lateness of effort to the grounds, and the smaller sized fish impacted catch.





Haida Gwaii

- Charter seine "Queens Reach" March 9 to April 2 (25 days)
- Spawn recon charter vessel "Victoria Rose" March 30 to April 17 (20 days: 6 funded by AFS and 13 by the HCRS)
- Spawn dive charter "Lasqueti Explorer", March 29 to April 22 (25 days)
- No dive survey Area 2W.
- No commercial roe herring fishery openings as a result of an interlocutory injunction.

COASTWIDE ROE HERRING QUOTAS and CATCH

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- Total seine quota: 19,840 tons
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2015 ROE SEASON SUMMARY

FEEDBACK AND DISCUSSIONS



Canada

**HIAB Post-season Meeting
May 7/15
Wosk Centre, Vancouver**

Meeting Summary

Attendance:

Name	Affiliation	Name	Affiliation
Heather Mearnes	HIAB	Beth Petley-Jones	DFO
Rob Morley	HIAB	Terry Palfrey	DFO
Brad Mirau	HIAB	Roger Kanno	DFO
Colin Smith	HIAB	Corey Jackson	DFO
John Malcolm	HIAB	Brenda Spence	DFO
Josh Young	HIAB	Peter Hall	DFO
Bob Rezansoff	HIAB	Steven Groves	DFO
Don Heron	HIAB	Andrea Goruk	DFO
Chris Cue	HIAB	Pierre Corville	DFO
Mitch Ponak	HIAB	Peter Katinic	DFO
Chris Wick	HIAB	Jaclyn Clearey	DFO
Sean Halladay	Industry	Dennis Chalmers	Province
Mike Rekis	Industry		
Brent Melan	Industry		
John Lenic	Industry		

Summary of Key Points:

1. Herring Stock Assessment Program – Given the recent shift in herring run timing and spawn location, consideration should be given to adjust the timing of stock assessment charters and to extending surveys to cover significant spawns in locations adjacent to the Major Management Areas, eg. Kyuquot on the WCVI.
2. At Sea Observers (ASOs) – Because of the extended roe fishery period, DFO required ASOs to cover peripheral fisheries in 2015 and it is anticipated that there will be an observer requirement in future fisheries. The program has limitations, eg observer availability. It is recommended that a subcommittee of HIAB work with DFO managers to develop protocols for efficient utilization of ASOs in future herring fisheries. This should be discussed at a followup HIAB caucus session.
3. Industry Funded Seine Testfishery - The volunteer seine testfishery piloted in the St. of Georgia in 2015 was not effective in supporting management of the seine fishery. Funding for test vessels remains an issue; however, there is a need to consider a program of ‘committed’ seine test vessels for 2016 to ensure fishing opportunities are not missed. There is also a need to ensure a standard

sampling protocol in the test fishery. This should be discussed at a follow-up HIAB caucus session.

4. The continued late timing of DFO decisions relating to the herring IFMP and the herring stock assessment program has seriously undermined efforts to effectively organize and implement herring fishery programs in recent years. This problem is exacerbated by early timing of herring spawns, which creates a particular issue for roe herring licensing. HIAB strongly recommends DFO plan for timely decision making in preparation for 2016 herring fisheries.
5. Central Coast Roe Fishery in 2015 – HIAB commends the work by DFO managers in support of the Central Coast seine fishery. However, the reaction by DFO to Heiltsuk protests, relegating gill nets to locations in the Central Coast that would not support a viable fishery, resulted in a significant economic loss to fishermen licensed in the area. Given the strong showing of herring in 2015, it's likely there will be sufficient herring for a roe fishery in 2016, therefore there is a need for DFO to reconcile differences with the First Nations to avoid future interference with roe fisheries. Roe fishermen are prepared to work with the First Nations and DFO to plan so both SOK and roe fisheries can be successful.
6. DFO has outlined a plan for renewal of the herring management framework (see the presentation 'Renewal of the Management Framework for Pacific Herring'. The process is anticipated to require several years to complete though no substantive changes to the herring management framework are planned for 2016. As part of this process, work is underway to establish Limit Reference Points (LRP) which will be used to evaluate alternative Harvest Control Rules for herring. A series of Pacific Herring Simulation Workshops have been arranged to review candidate LRPs and the outcomes of model simulations. A workshop for HIAB is scheduled as follows:

**0900 – 1600 hrs, Thursday, May 21/15
Room 2200, SFU Harbour Centre, Vancouver**

7. There is some interest among the herring industry to pursue an Individual Transferable Quota program and DFO has committed to collaborating with the industry to explore ITQ options. This is an issue for a followup HIAB caucus session.
8. DFO has requested a plan for the Food and Bait fishery in 2015 -16. This is an issue for a followup HIAB caucus session.
9. The next HIAB meeting is scheduled as follows:

**0900 – 1600 hrs, May 19/15
Room 2520, SFU Harbour Centre, 515 W. Hastings St., Vancouver**

HIAB Meeting Summary
May 19/15
SFU, Harbour Centre, Vancouver

Attendance:

Bob Rezansoff	Chris Wick
Don Heron	Sean Halladay
Josh Young	John Nishidate
John Lenic	Rob Morley
Mitch Ponak	Bob Morreau
Terry Henshaw	

Summary:

1. Individual Quotas:

The committee reviewed a short Individual Quota options paper developed by DFO (attached) and discussed the utility of moving to an IQ system in the herring fishery. There was considerable discussion about the pros and cons of IQs, summarized below:

- a. Pros
 - i. There is some thought that IQs will better secure licence holders long term access to a share of the herring resource.
 - ii. IQs would provide the flexibility to move shares between gear types (sn and gn) and fisheries (Food & Bait and Roe).
 - iii. IQs may provide a vehicle for reducing licence fees.
- b. Cons
 - i. An IQ initiative may open the door to herring access requests from interests outside the current herring industry.
 - ii. There is concern that there could be a permanent movement of quota from gill net to seines which could negatively impact gill net access.
 - iii. Some gill net advisors do not see an advantage accruing to them from an IQ.

Next steps – At the current time, the industry is not ready for a system of free transfer between fisheries and is not motivated to move to IQ management; however there are some that are supportive. There is some uncertainty among advisors about what an IQ is, and differing views about the implications for fisheries. In order to broaden the discussion, it is recommended that interested individuals document and distribute their views among HIAB advisors. Written submissions can be provided to Greg Thomas for distribution.

Action: Rob Morley and Greg Thomas to pursue the licence fee issue with DFO.

2. Industry Funded Seine Test Fishery for 2016:

It is agreed that there is a requirement for dedicated seine test vessels in the St. of Georgia, therefore, an industry funded program consistent with previous years will be arranged for 2016. Recognizing the difficult economic situation, the program will be shaped so that costs are minimized.

Action: Greg Thomas to arrange the IFTF program at a Pool Captain's meeting prior to the 2016 fishery. Bob Morreau and Chris Cue will coordinate the program inseason with the St. of Georgia Seine fishery manager.

3. 2015-16 Food & Bait Fishery Plan:

It is recommended that opportunities for Food & Bait, as well as roe fisheries, be pursued in all management areas with a commercial surplus in 2016. It is also recommended that an earlier opening and extended open areas be requested.

HIAB supports continuing the pilot Food & Bait licensing system initiated in 2014-15 which provides equal access to all roe seine licence holders.

To accommodate the concern that the extended bait fishery in 2014-15 may have impacted roe opportunities, it was agreed that a buffer should be maintained between the two fisheries in 2015-16, the details to be confirmed in the September HIAB meeting. A potential approach is to suspend the Food & Bait fishery in early February, and consider a further Food & Bait fishery after there has been a reasonable roe opportunity.

It was agreed that a quota recommendation for the 2015-16 Food & Bait fishery will be developed in the fall HIAB meetings based on available TAC's and market information.

4. Fishery Monitoring Subcommittee

HIAB supports the formation of a Joint Fishery Monitoring Subcommittee to review with DFO monitoring requirements in herring fisheries , including At Sea Observers. The committee will meet as required beginning in June/15. Industry representatives on the committee are:

Chris Cue
Jack Groven
Sean Halladay
John Lenic
Mitch Ponak

5. Upcoming meetings as part of DFO's Herring Renewal Initiative include:

Pacific Herring Simulation Workshop, May 21/15 – DFO research staff and contractors introduce a simulation model used to evaluate alternative Management Procedures relative to a suite of candidate Limit Reference Points.

CSAS Meeting, May 27 – 28/15 – Review of paper, 'Candidate Limit Reference Points for Pacific Herring in British Columbia using a Closed-loop Modelling Approach'.

Pacific Herring Summit cohosted by the Ocean Modelling Forum, June 8 – 10/15, Richmond.

6. Media Response:

The commercial roe herring fishery continues to be challenged through articles presented in the media and on-line. To counter the mis-information provided in the media, the HCRS has contracted Jake Schweigert to develop two papers, attached. The first paper describes the prevailing information supporting the current herring stock concept employed by DFO in managing herring fisheries. The second responds directly to various perspectives provided in the media which challenge roe fisheries management.

2015 Science Overview

Jaclyn Cleary, Nathan Taylor

DFO Science

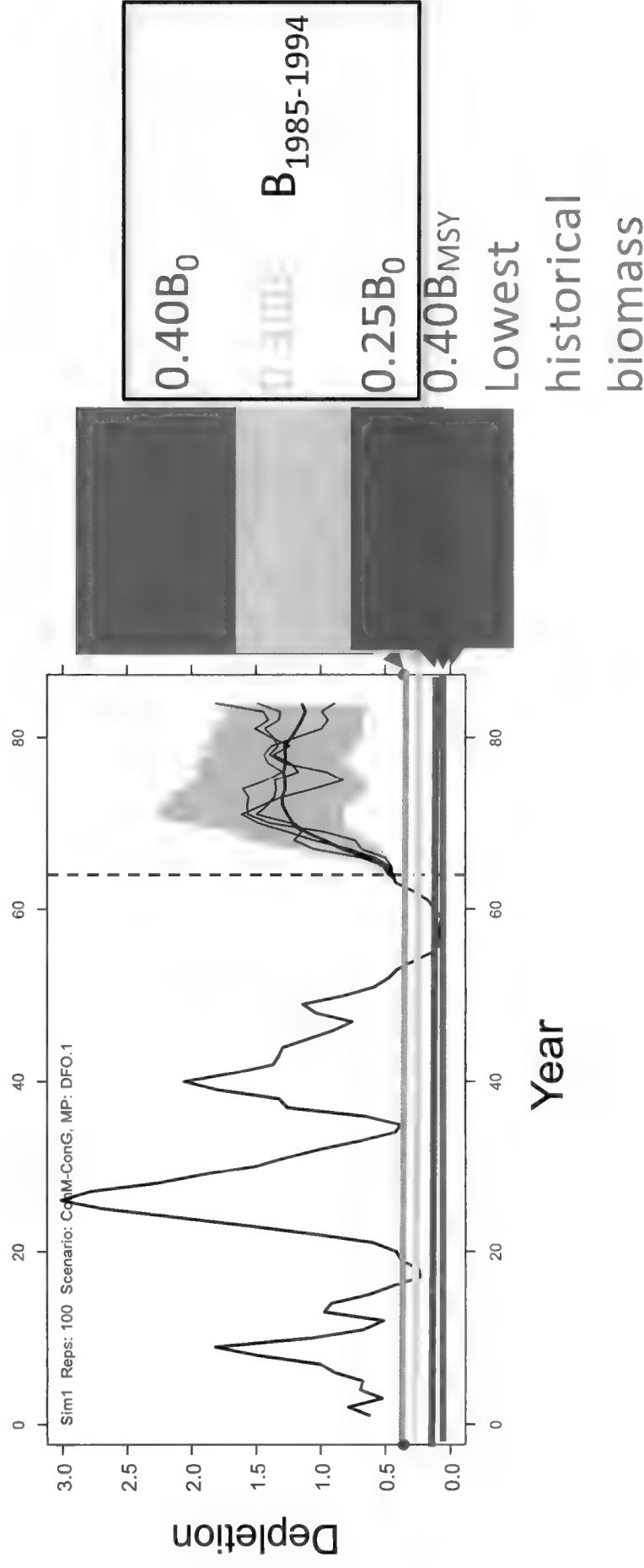
Nov 4, 2015

HIAB, Vancouver, BC

Two components in the 2015 SR:

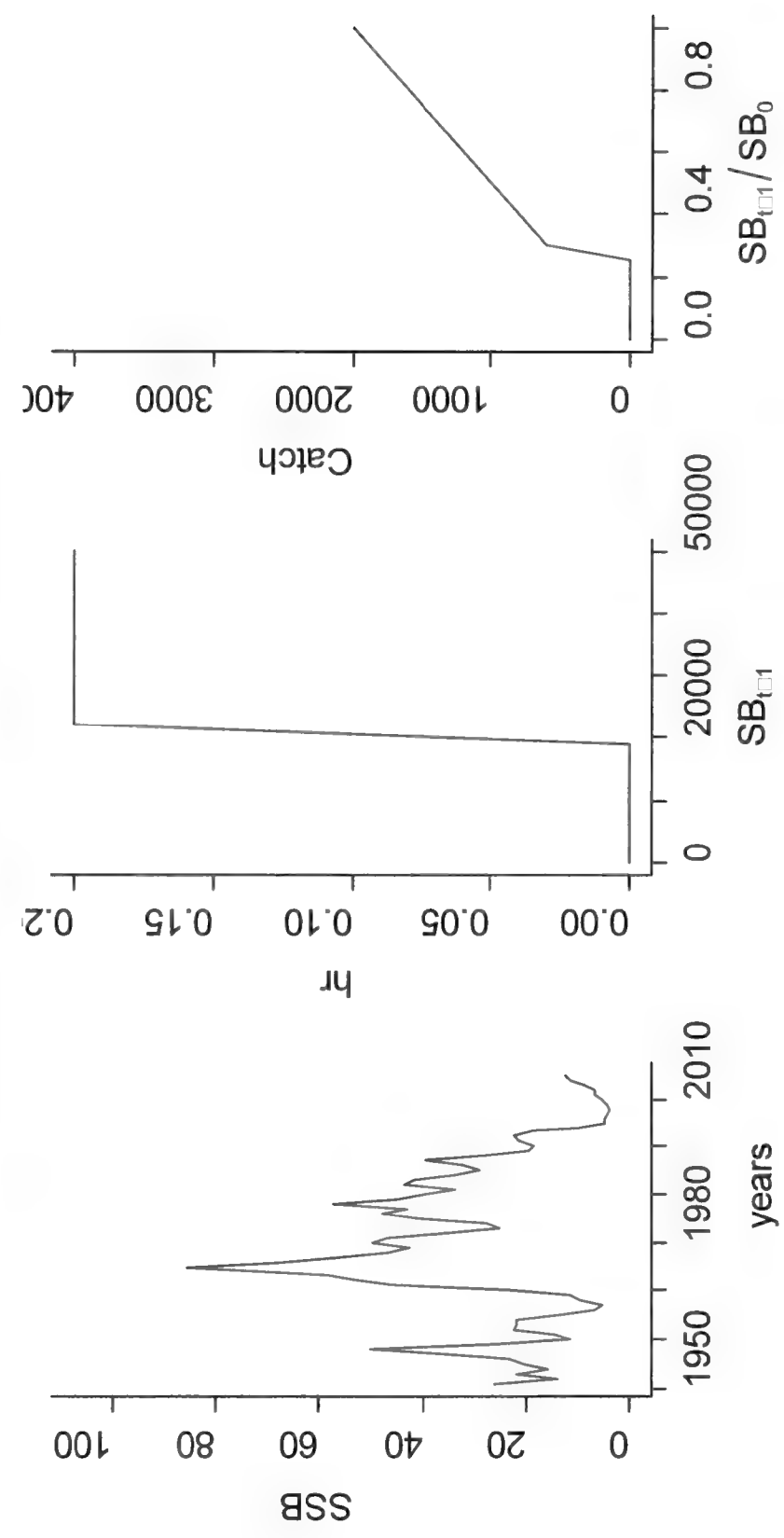
- Simulation analysis- performance evaluation of 2 MPs against *candidate LRPs*
 - Includes performance metrics for catch, AAV
- Stock assessment using 2 assessment models
 - AM1: estimate q / variable cut-off
 - AM2: $q_2=1$ / fixed cut-offs
 - Biomass projections for 2016 using AM1 and AM2, and associated decision tables

Recap: Candidate LRPs: threshold state of stock (or fishery) that is undesirable



Main Question for part 2: What are the potential consequences of adopting the current or historical MP for managing BC herring fisheries?

Background Herring Management Procedure, before 2011



cut-offs fixed since '96

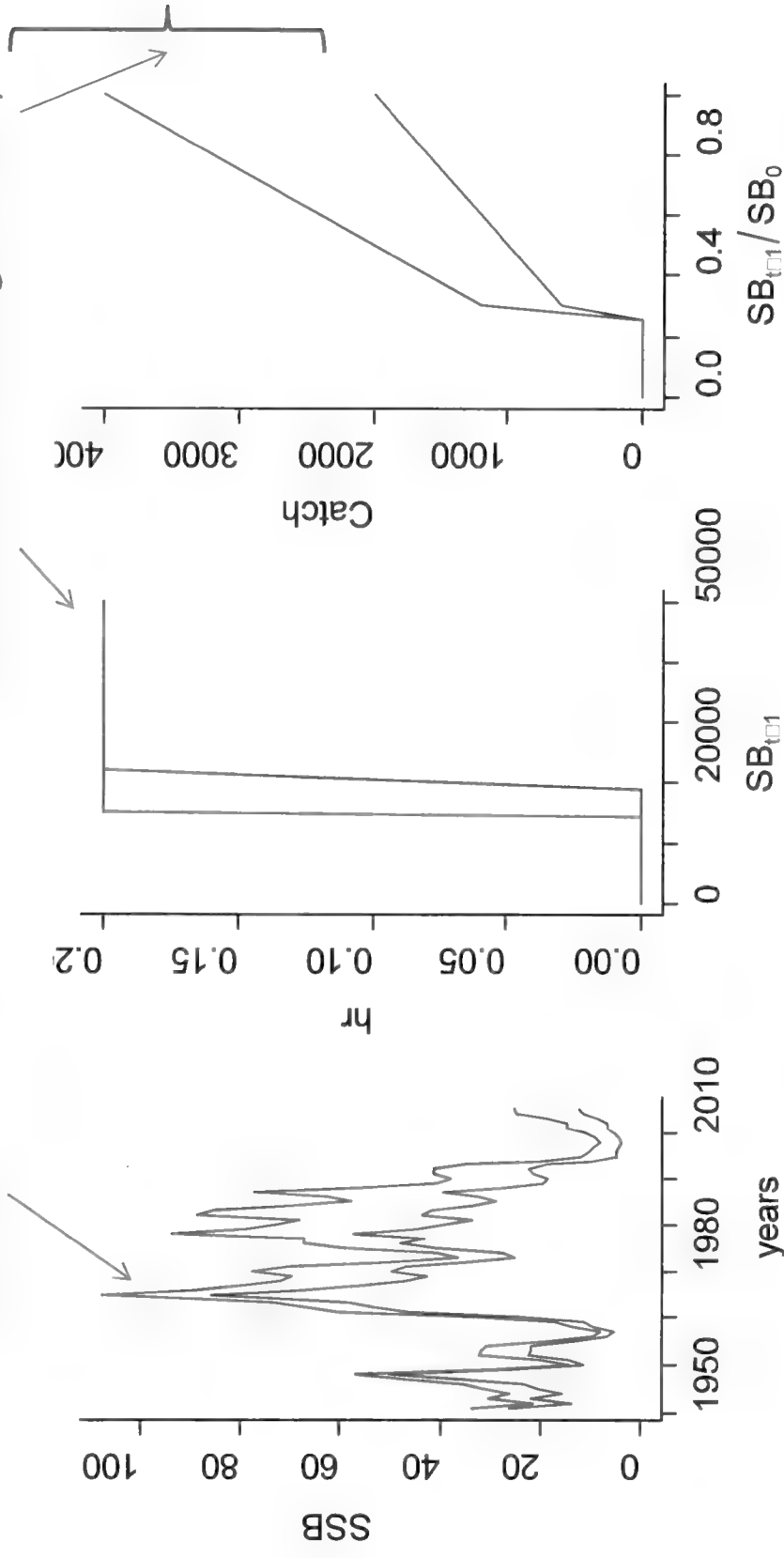
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Resulting Management Procedure Changes

Historic assessment
 Current assessment

Very different harvest control rule in absolute terms (fishery open and lower biomass levels and higher catch)

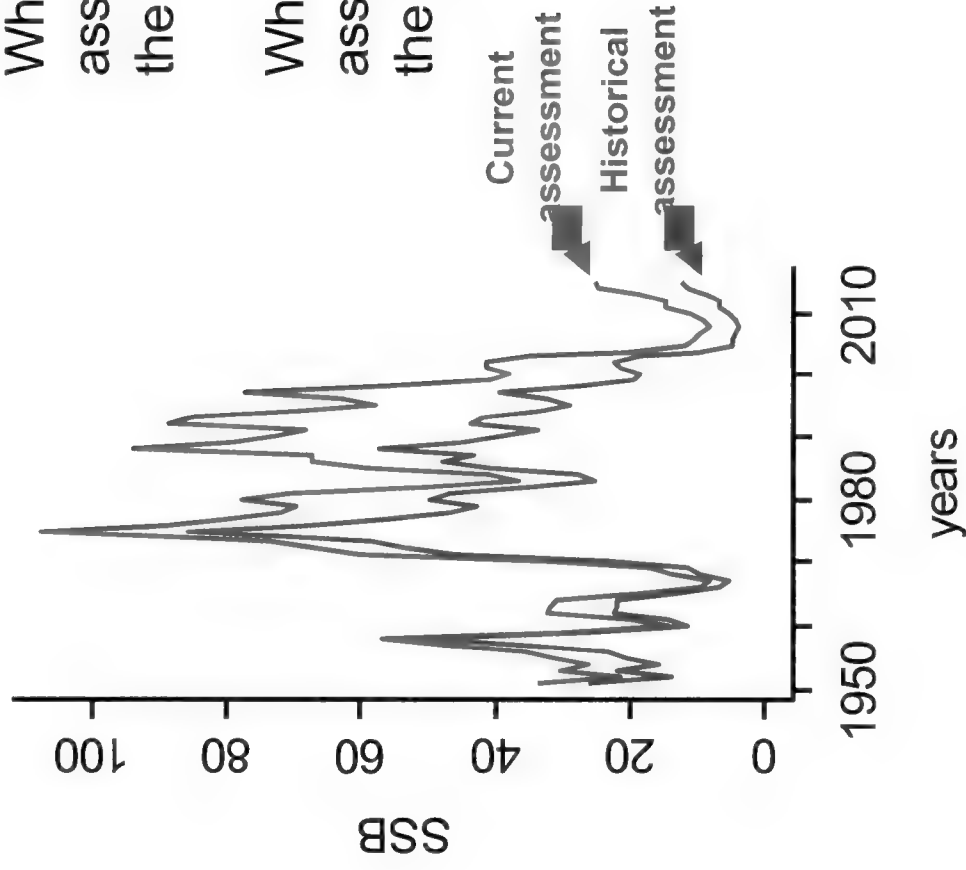
Higher biomass estimates



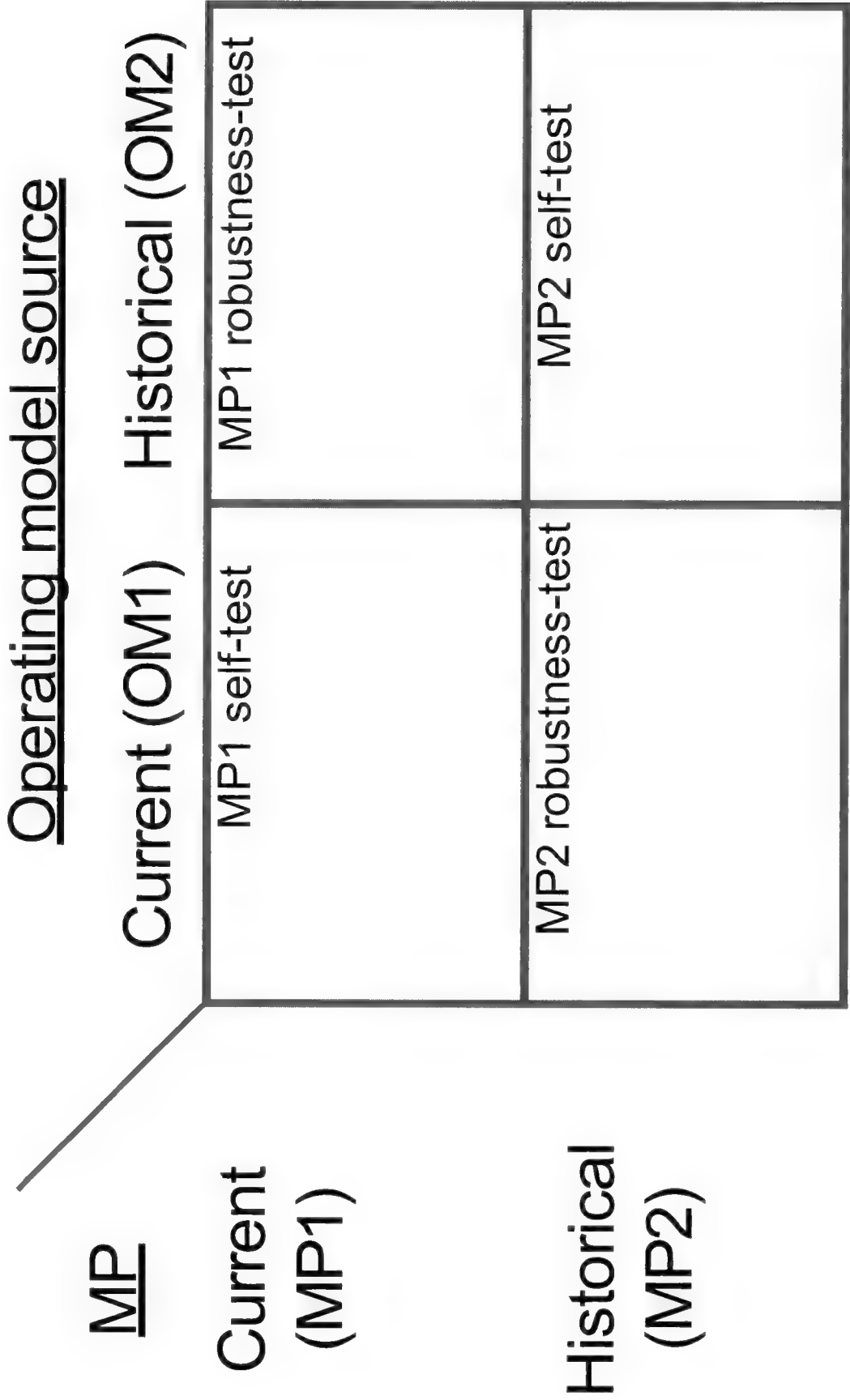
Operating models: we don't know which is correct

What if we applied the Current
assessment, when assumptions underlying
the Historical assessment are actually true?

What if we applied the Historical
assessment, when assumptions underlying
the Current assessment are actually true?



Science Response Simulation Design



Important conclusions

- When results are averaged across the two alternative OMs, and using a 95% probability level:
 - Across all stocks, all MPs failed to meet the high-biomass LRP objectives ($0.40B_0$, CC-LRP of $B_{1985-1994}$);
 - Both model-based MPs failed to meet the $0.25B_0$ and $0.30B_0$ LRP criteria for SOG and CC;
 - No MP met any LRP criteria for CC;
 - Even with 10% harvest rate
 - Both model-based MPs met the $0.25B_0$ and $0.30B_0$ LRP criteria for HG, PRD; and,
 - Only MP2 met the $0.25B_0$ and $0.30B_0$ LRP criteria for WCVI.

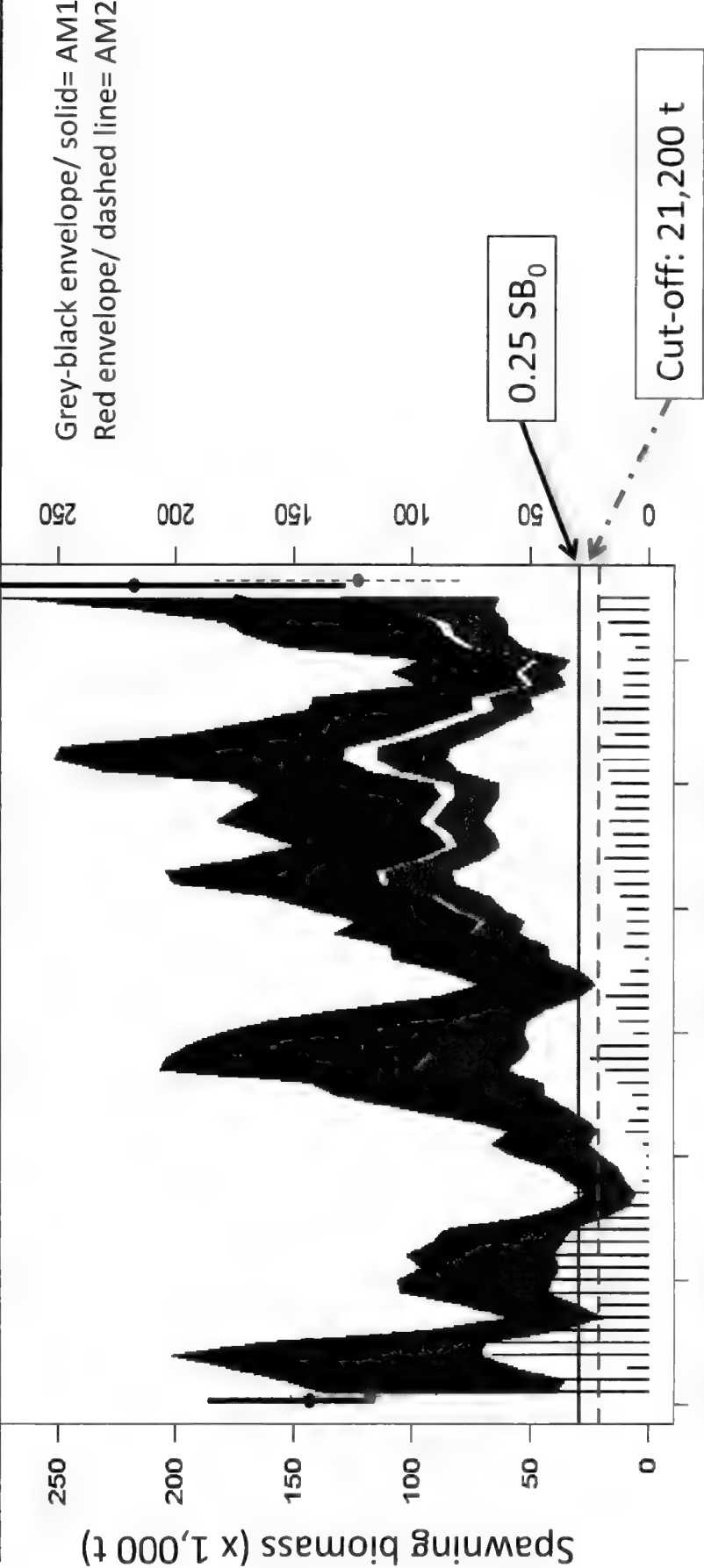
Broader Recommendations

1. Work toward clarifying objectives for MSE: what are the goals and priorities in each area?
2. Develop new candidate MPs aimed at meeting goals defined in (1).
3. Operating models (OM1 and OM2) are limited for all stocks. Develop and test other scenarios (e.g., that natural mortality is actually not changing...)
4. Revise MP1 and MP2 approximations to more accurately reflect Historical and Current MPs.
5. Consider MSE training strategy for managers, First Nations, stakeholders.

2016 projections and status relative to cut-offs using AM1 and AM2

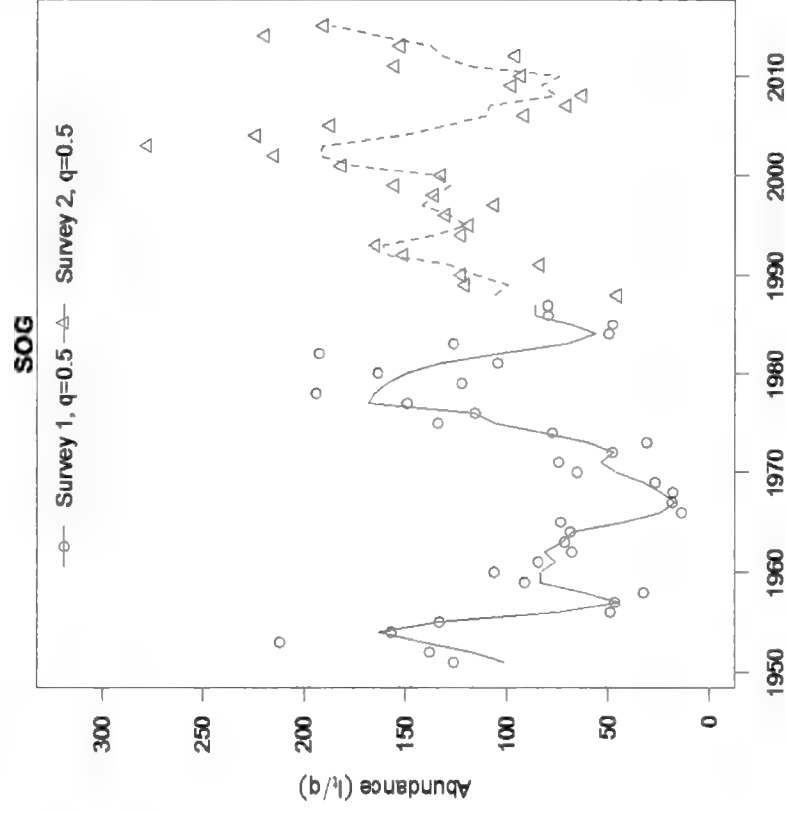
SOG

Recent trends in spawning biomass	Median spawning biomass in 2015	Projected trends in SB for 2016	Median pre-harvest SB in 2016	Median pre-harvest SB in 2016 relative to cut-offs
Estimated increasing trend since 2010; current biomass 78% (AM2) - 122% (AM1) of unfished level.	AM1 (q est) AM2 (q=1)	increase	SB_2016: 217,800 t SB_2016: 123,000 t	Prob < 0.25 SB ₀ = 0% Prob < 21,200 t = 0%
	SB_2015: 174,687 t SB_2015: 92,511 t			

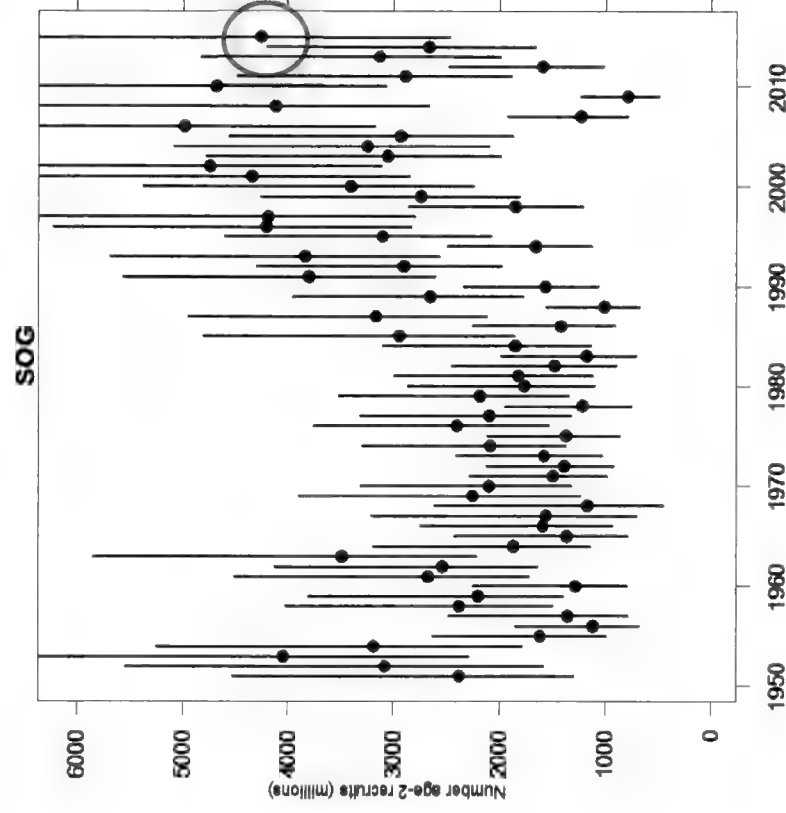


SOG: primary drivers of projected increase:

Model estimates increasing trend in spawn index from 2010-2015

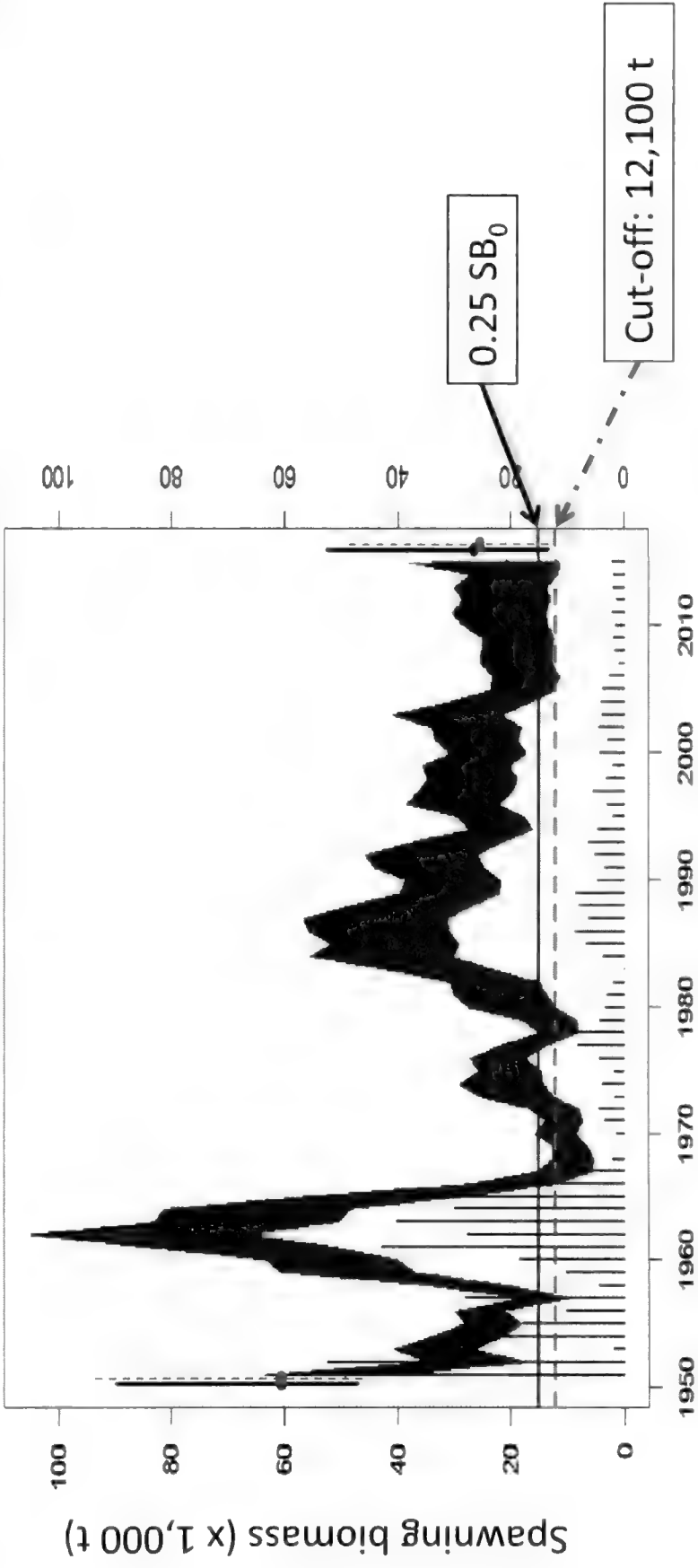


Model estimates above average age-2 recruits in 2015



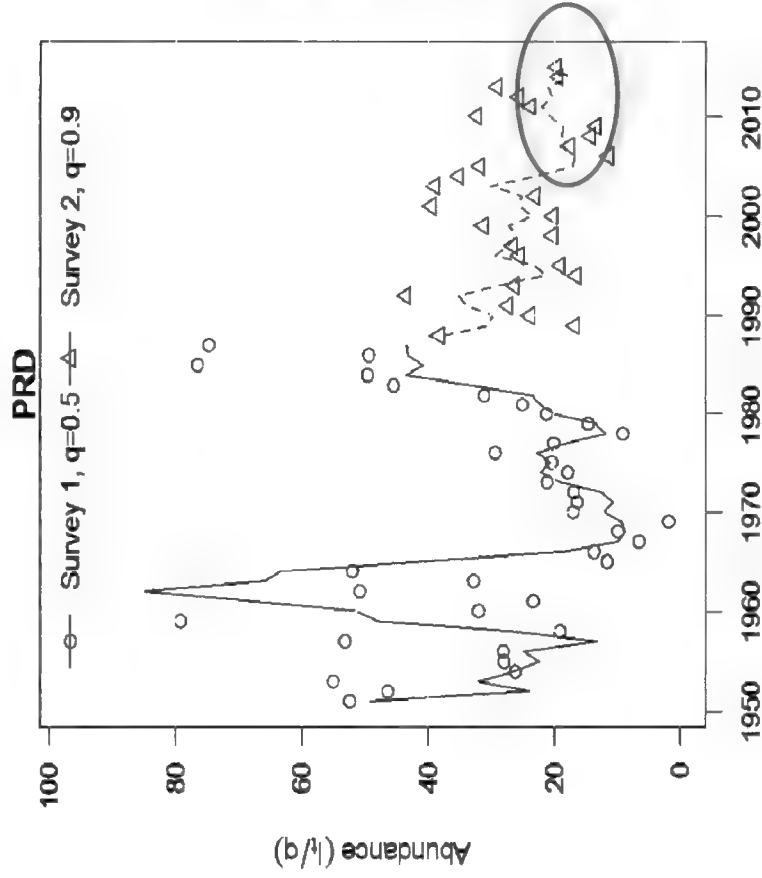
PRD

Recent trends in spawning biomass	Median spawning biomass in 2015	Projected trends in SB for 2016	Median pre-harvest SB in 2016	Median pre-harvest SB in 2016 relative to cut-offs
Stable biomass since mid-2000s with current biomass ~30% of unfished level; estimated increase from 2014 to 2015;	AM1 (q est)	increase	SB_2016: 26,580 t	Prob < 0.25 SB ₀ = 10%
	AM2 (q=1)		SB_2016: 25,530 t	Prob < 12,100 t = 3%

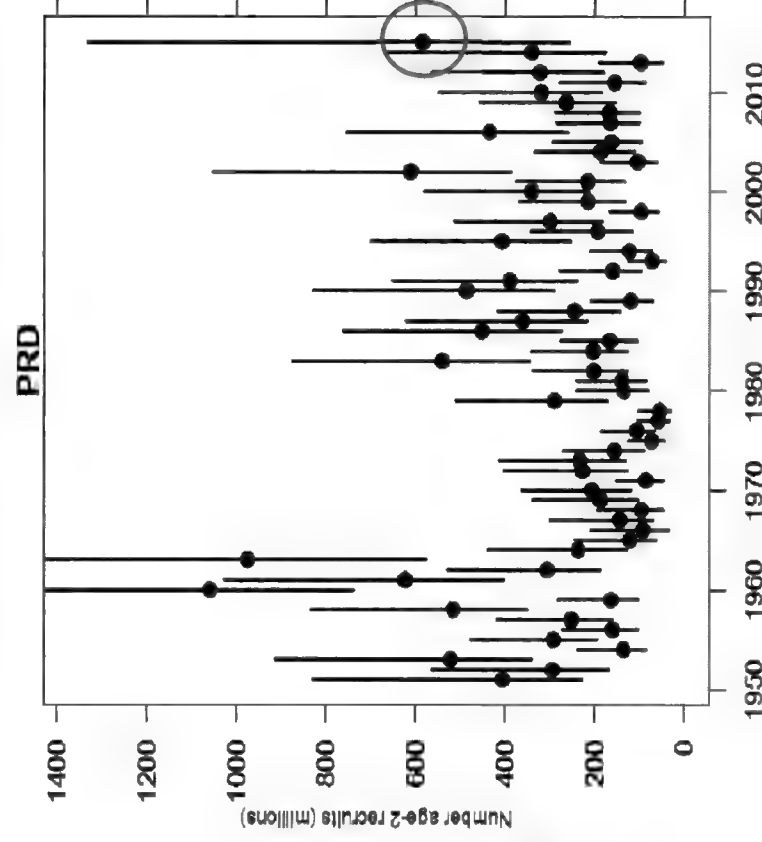


PRD: primary drivers of projected increase:

Model estimates stable trend in spawn index 2006-2015

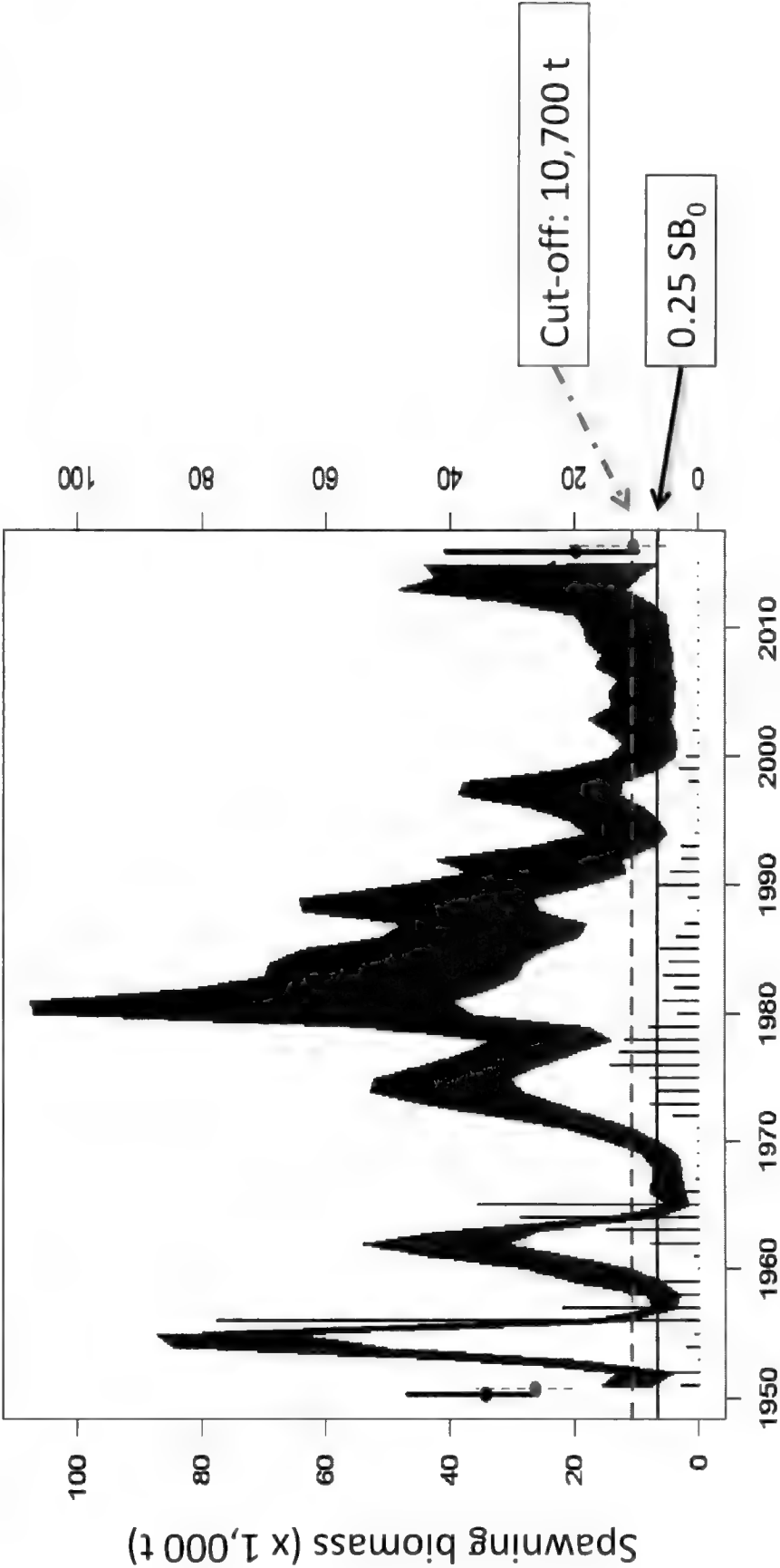


Model estimates above average age-2 recruits in 2015



HG

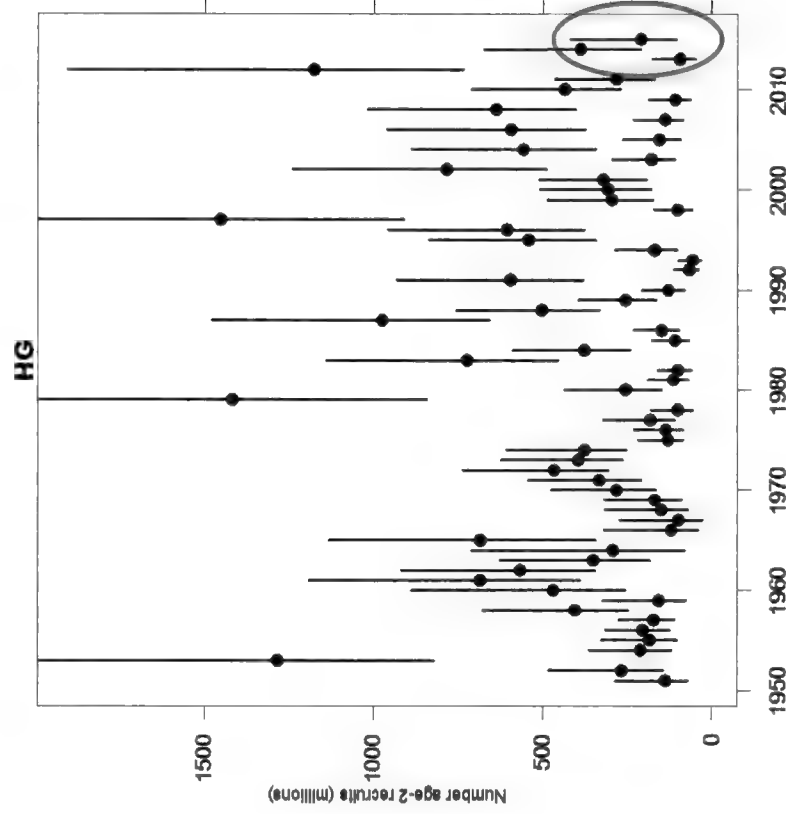
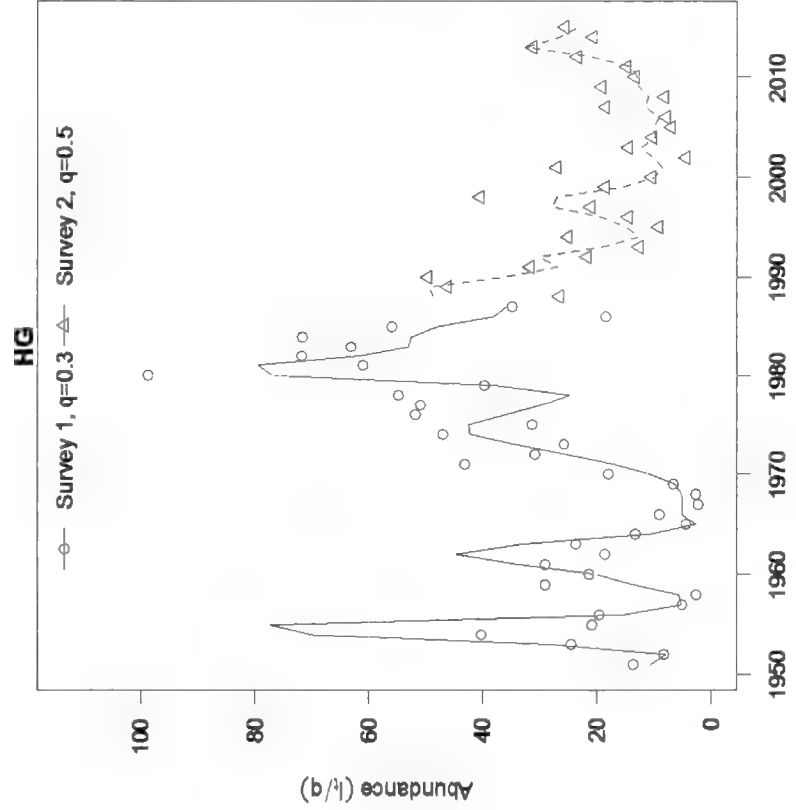
Recent trends in spawning biomass		Median spawning biomass in 2015	Projected trends in SB for 2016		Median pre-harvest SB in 2016	Median pre-harvest SB in 2016 relative to cut-offs
Stable biomass 2000-2011; inc. 2012-2013; declined 2013-2015. Status: 44% (AM2) - 66% (AM1) of B ₀ .	AM1 (q est)	SB_2015: 23,354 t	decline	AM1 (q est)	SB_2016: 19,795 t	Prob < 0.25 SB ₀ = 2%
	AM2 (q=1)	SB_2015: 11,892 t		AM2 (q=1)	SB_2016= 10,450 t	Prob < 10,700 t = 52%



HG: primary drivers of projected decline:

Model estimates decline from 2013-2015

Model estimates below average age-2 recruits in 2013-2015

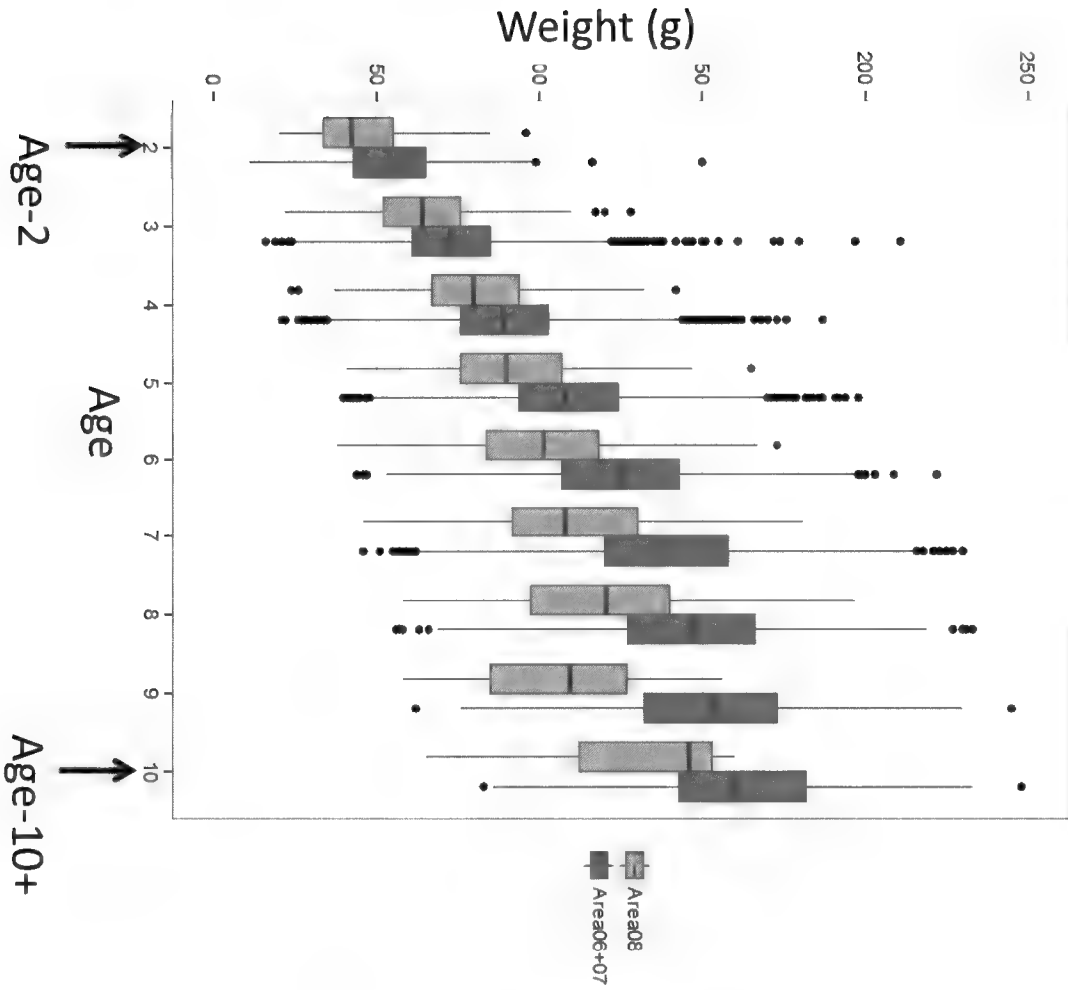


CC

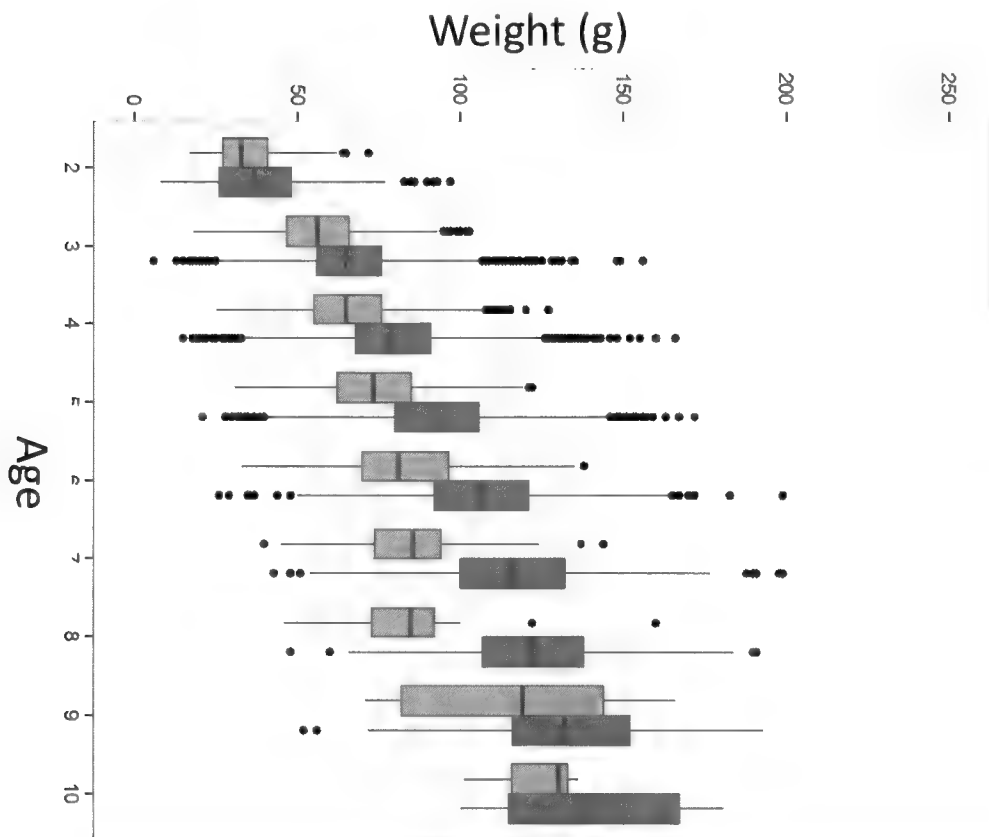
- Inclusion of Area 08 in CC assessment area was identified by HTC-DFO Tech Team as area of concern for FNs
 - CC boundaries historically delineated based on distribution of spawning areas, tagging studies, genetics, historical fishing
 - Area 08 typically has fish smaller at age, and has been of limited interest to commercial roe or SU sectors since 1970s.
 - Area 08 makes up ~10% spawn biomass
- Concern: Inclusion of Area 08 in CC aggregate biomass results in Areas 06,07 being fished more heavily than would be expected based on relative contribution to the aggregate biomass
- SR provides biomass estimates and projections for 2016 for both CC aggregate stock and Areas 06,07 (exclude Area 08)

CC

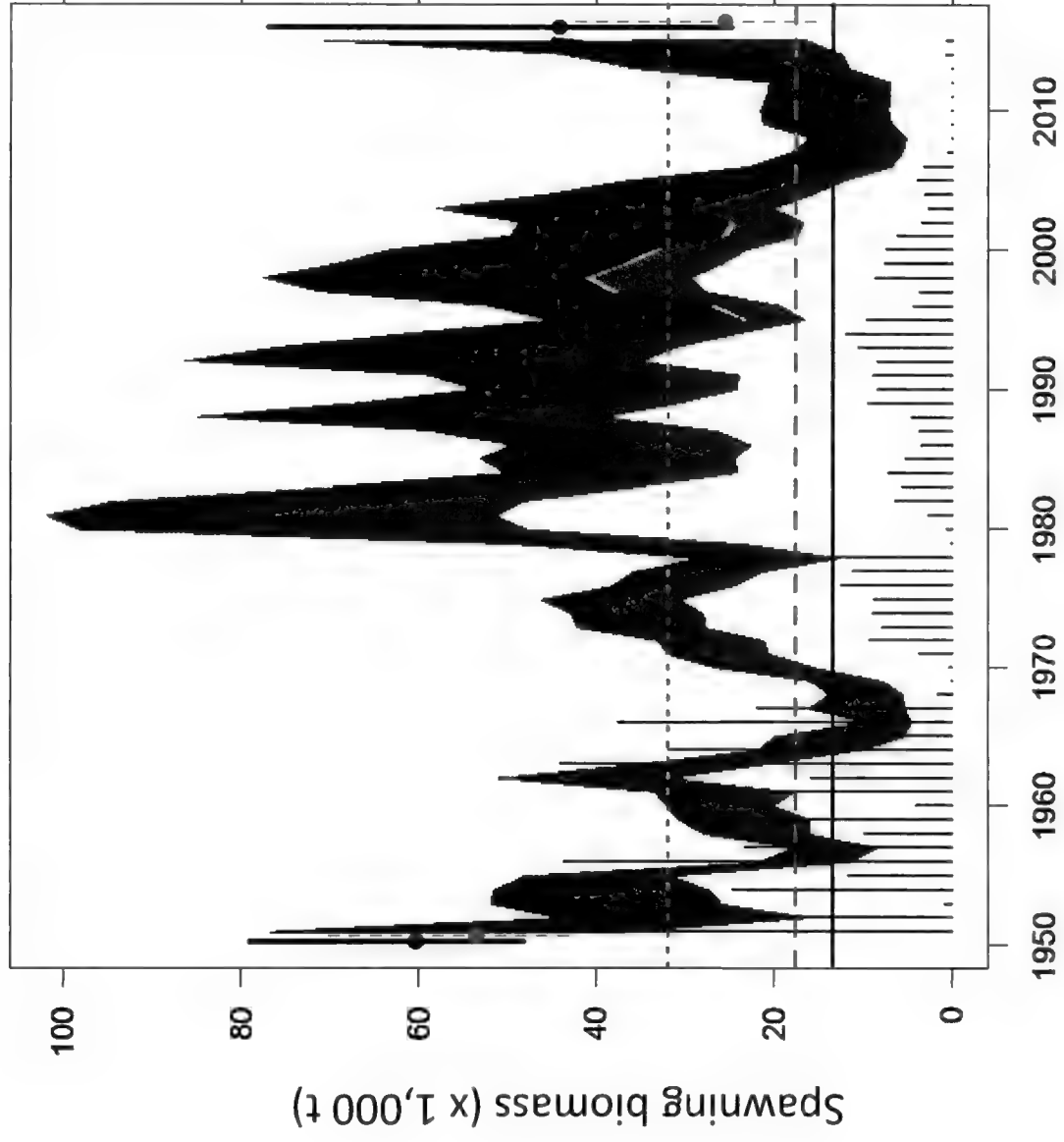
1996-2005



2006-2015



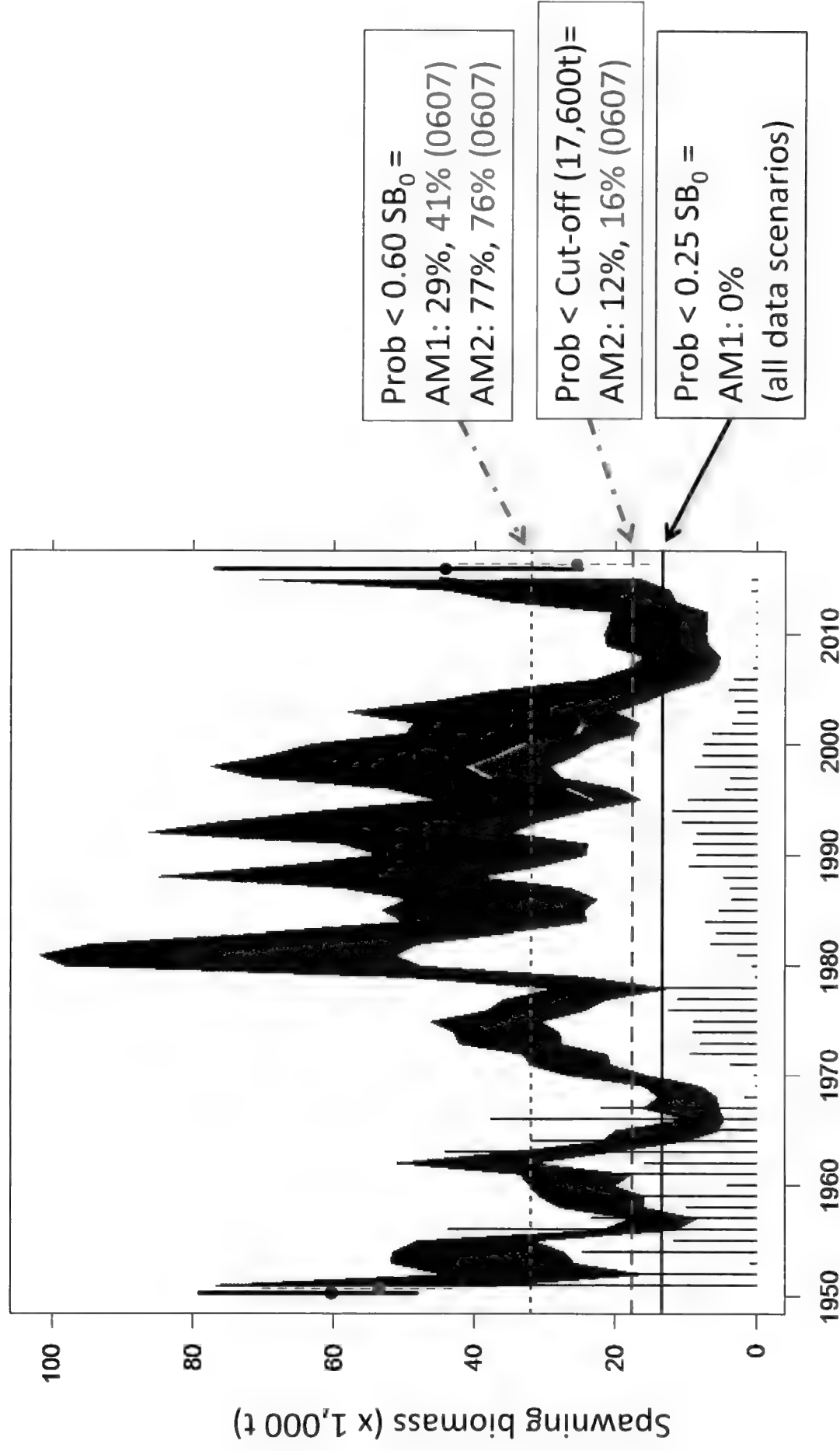
CC



Spawning biomass increase from 2012 to 2015 - regardless of incl/excl Area 08; current biomass 46% (AM2) - 75% (AM1) of unfished level.

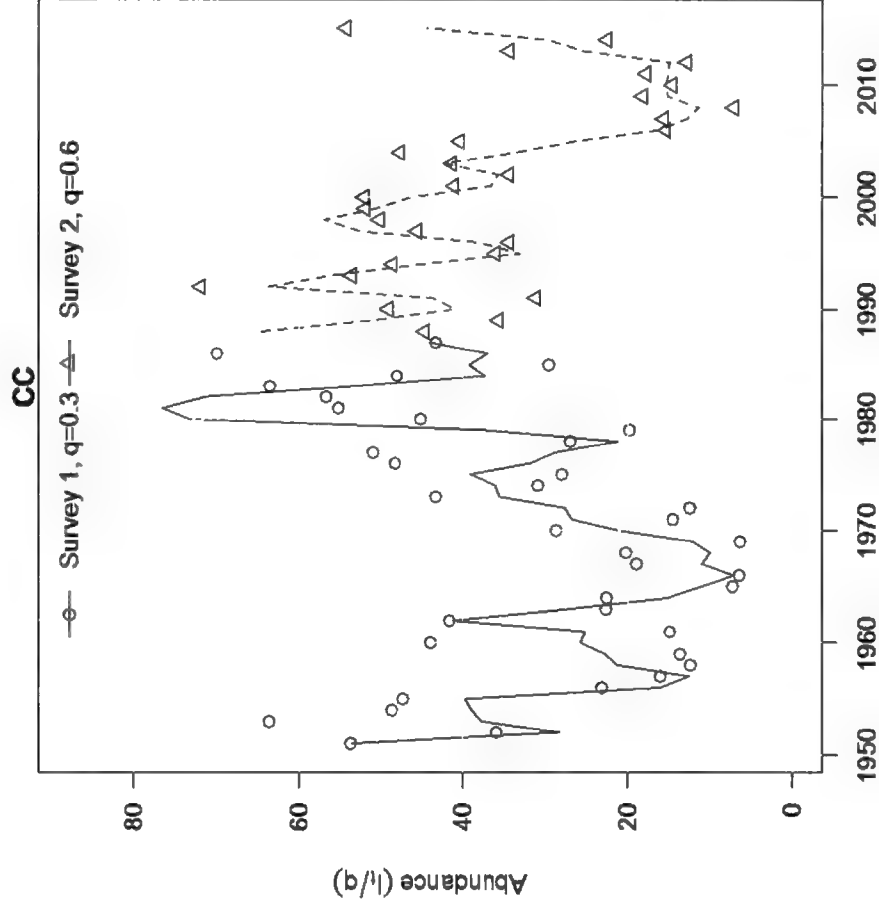
Median projected biomass for 2016 near identical to 2015 estimates (holds true for both data scenarios and both models).

CC

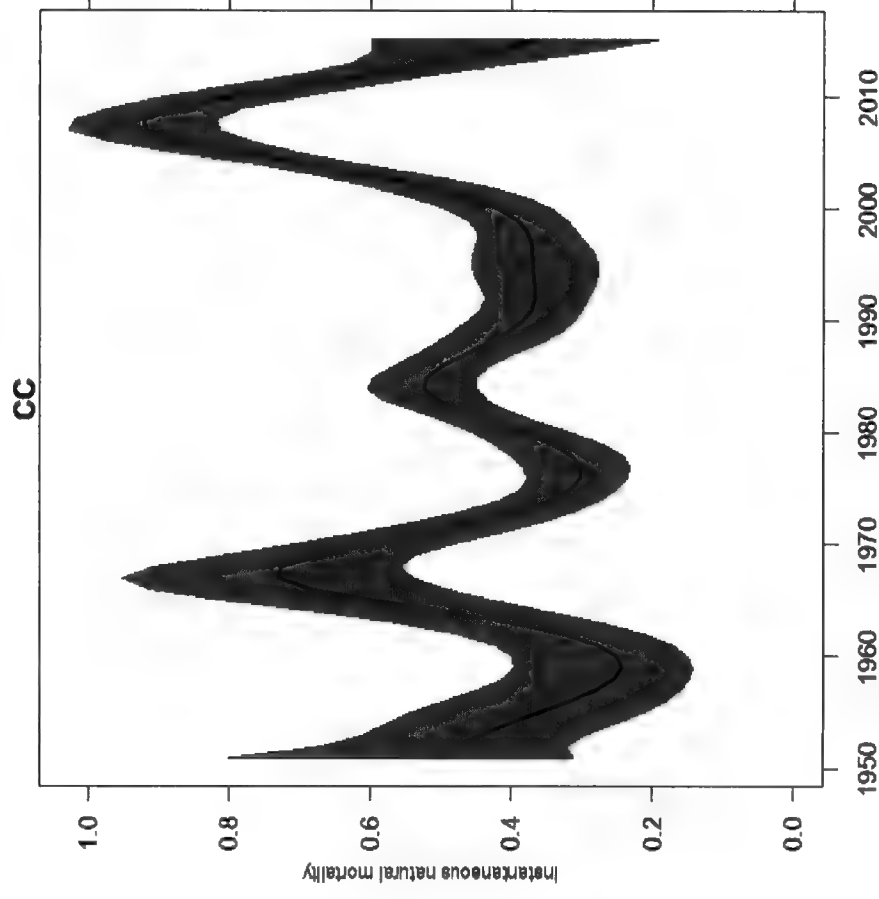


CC: primary drivers of projected increase:

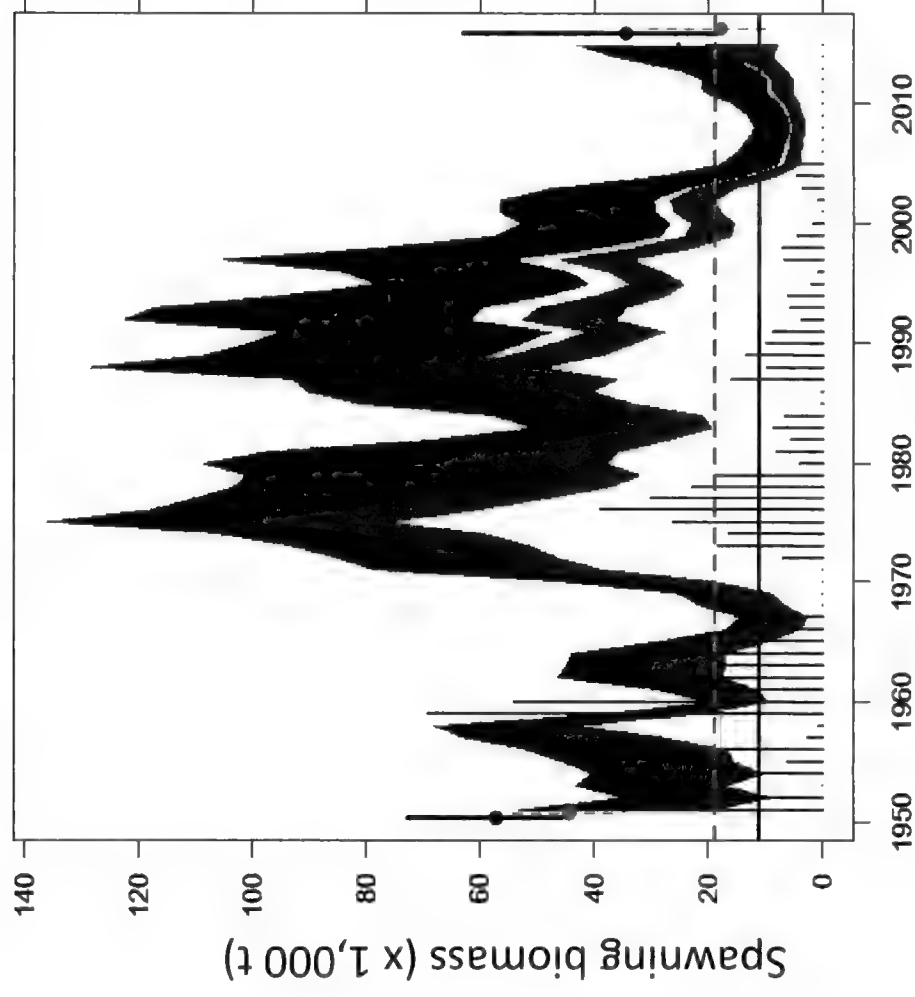
Model estimates increase from
2012-2015



Model estimates decline in
natural mortality



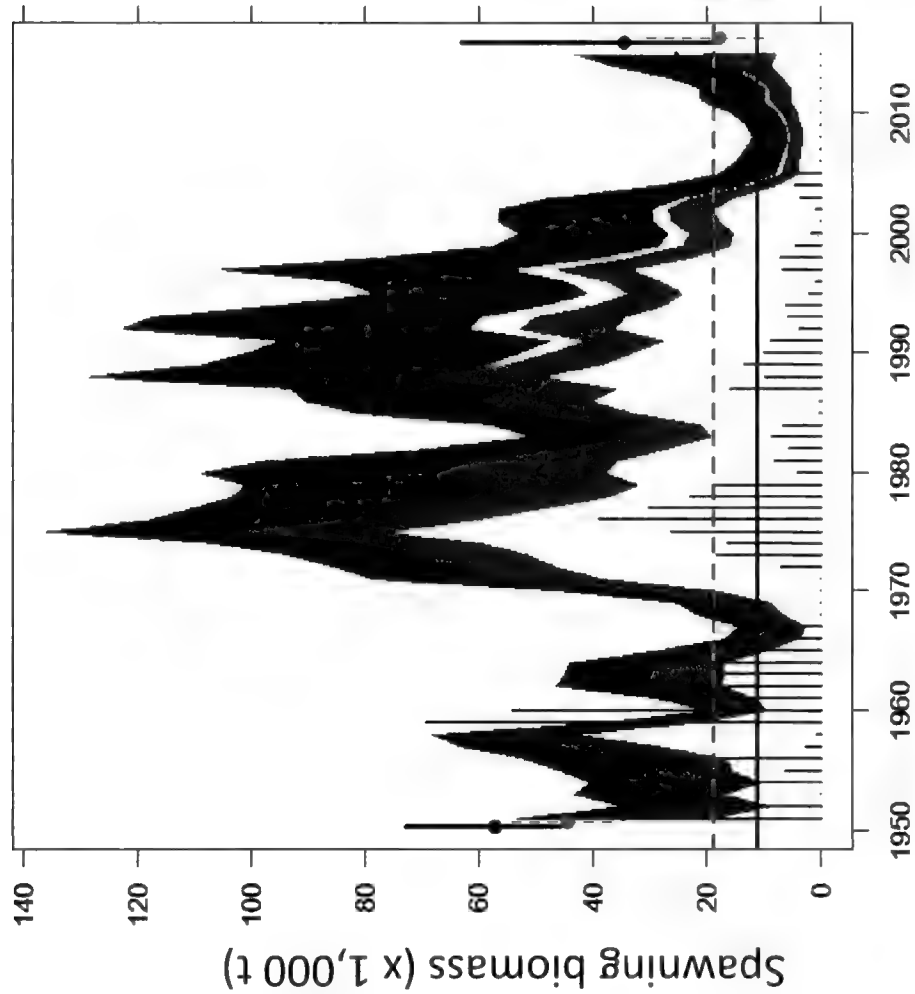
WCVI



Estimated increase in spawning biomass since 2010, Model(s) estimate a small increase in spawning biomass from 2014 to 2015, with large uncertainty in all estimates; current biomass 28% (AM2) - 44% (AM1) of unfished.

Median spawning biomass projected to increase in 2016.

WCVI

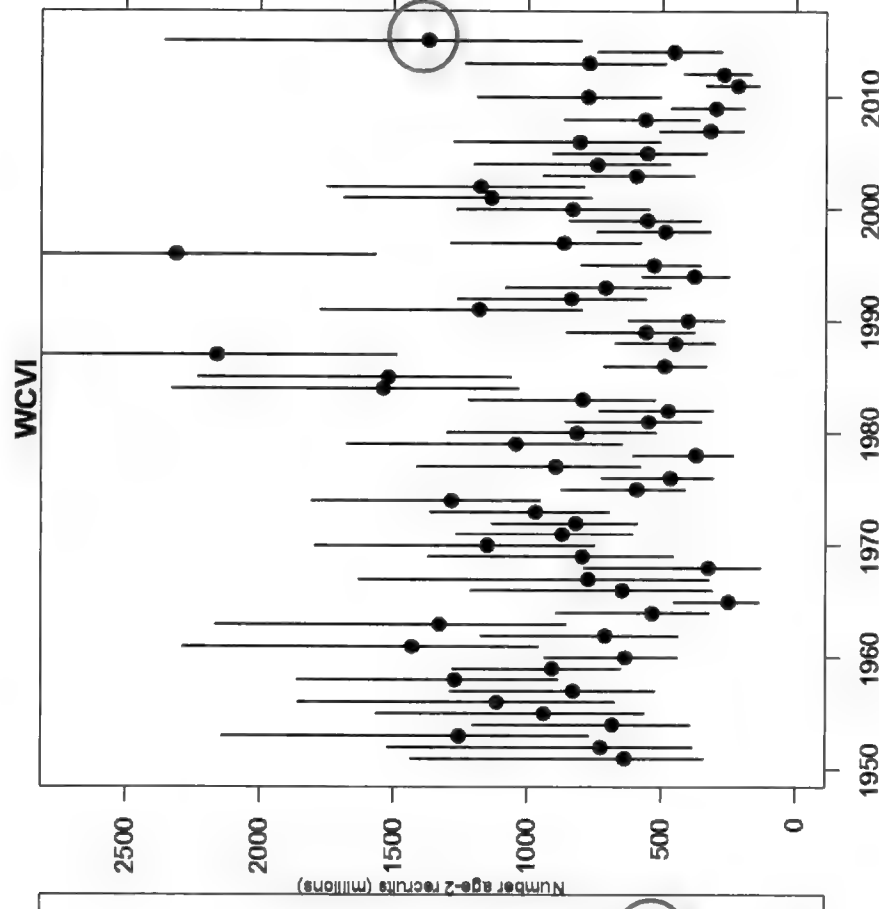
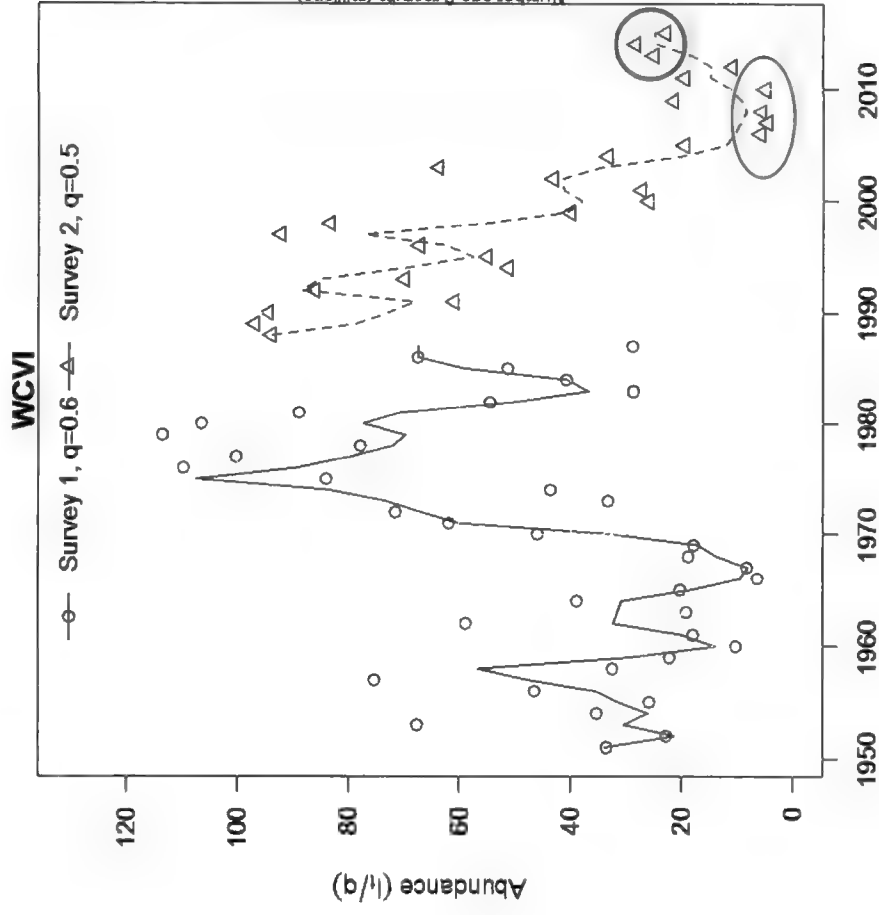


	Median pre-harvest SB in 2016	Median pre-harvest SB in 2016 relative to cut-offs
AM1 (q est)	SB_2016: 34,450 t	Prob < 0.25SB_0 = 1%
AM2 (q=1)	SB_2016: 17,830 t	Prob < 18,800 t = 56%

WCVI: primary drivers of projected increase:

Lowest survey observations 2006-2008, 2010;
Similar survey biomass 2013-2015

Model estimates above average
age-2 recruits in 2015



Decision tables: provided by science to support decision making since 2013; example HG

Haida Gwaii (HG)				Haida Gwaii (HG)							
Biomass metrics – AM1			Harvest metrics – AM1		Biomass metrics – AM2		Harvest metrics – AM2				
TAC (metric tonnes)	Prob (biomass after harvest is below 0.25 SB_0 in 2016)	Median ratio of projected post-harvest biomass to 0.25 SB_0	Prob (removal rate > target HR)	Prob (removal rate > target HR)	Median removal rate	TAC (metric tonnes)	Prob (biomass after harvest is below cut-off in 2016)	Median ratio of projected post-harvest biomass to cut-off	Prob (removal rate > target HR)	Prob (removal rate > target HR)	Median removal rate
			$P(U'2016 > 20\%)$	$P(U'2016 > 10\%)$	Med (U'2016)				$P(U'2016 > 20\%)$	$P(U'2016 > 10\%)$	Med (U'2016)
0	0.02	2.30	0.00	0.00	0.00	0	0.52	0.98	0.00	0.00	0.00
500	0.03	2.26	0.00	0.00	0.03	500	0.55	0.94	0.00	0.03	0.05
820	0.03	2.24	0.00	0.02	0.04	820	0.57	0.92	0.01	0.25	0.08
1,000	0.03	2.22	0.00	0.05	0.05	1,000	0.58	0.91	0.02	0.42	0.09
1,080	0.03	2.22	0.00	0.07	0.05	1,080	0.58	0.91	0.04	0.50	0.10
1,540	0.04	2.18	0.01	0.25	0.08	1,540	0.61	0.88	0.18	0.80	0.14
1,700	0.04	2.17	0.02	0.34	0.08	1,700	0.62	0.87	0.25	0.87	0.15
2,000	0.04	2.14	0.04	0.48	0.10	2,000	0.64	0.85	0.39	0.93	0.18
2,040	0.05	2.14	0.04	0.50	0.10	2,040	0.64	0.85	0.41	0.94	0.18
2,230	0.05	2.13	0.07	0.58	0.11	2,230	0.65	0.84	0.50	0.96	0.20
3,000	0.06	2.07	0.21	0.81	0.14	3,000	0.69	0.79	0.76	0.99	0.26
3,170	0.06	2.05	0.25	0.84	0.15	3,170	0.69	0.78	0.80	0.99	0.27
4,000	0.08	1.99	0.45	0.94	0.19	4,000	0.73	0.73	0.92	1.00	0.34
4,230	0.08	1.97	0.50	0.95	0.20	4,230	0.74	0.72	0.94	1.00	0.35
6,000	0.12	1.84	0.79	0.99	0.27	6,000	0.79	0.62	0.99	1.00	0.48

Key conclusions

- Management Strategy Evaluation for Pacific herring is just beginning
- The simulations that we've shown you illustrate the performance of a given management procedure with repeated application in the long term
 - This is the first iteration of several
- Choosing a specific management procedure will require the refinement of objectives that can be used to rank tested procedures
- The definition of these objectives and other hypotheses about that state of nature will also help define the kind of work that is done in order to determine with they could be met
- In the interim, there is still a need to make decisions about catches for this coming year and the assessment helps inform this process.
- Pilot Technical Working Group
 - Defining scope of the work, expanded participation



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Pacific Herring Fisheries Planning and Management Approach for 2015/16

Presentation to HIAB

November 4, 2015

Canada



Overview

- The purpose of this presentation is to:
 - Outline the current context for Pacific herring;
 - Identify key considerations and upcoming decisions required for the 2015/16 season; and
 - Seek advice and recommendations regarding an interim management approach for 2015/16, including potential harvest levels.



Context

- The current context around Pacific herring continues to be challenging, including:
 - Continued variability in stock status;
 - Environmental uncertainty;
 - Varying levels of success in Aboriginal and commercial herring fisheries;
 - Outstanding questions regarding DFO's management approach and the science/stock assessment used to inform decision-making; and
 - Acrimony and on-grounds conflict in some areas.
- In order to help address these challenges, DFO has initiated a broad renewal of the management framework for Pacific herring.



Pacific Herring Renewal

- DFO has initiated a broad review and renewal of the management framework for Pacific herring (“Pacific Herring Renewal”).
- This work is being guided by the Sustainable Fisheries Framework (SFF) and extensive collaboration/engagement with First Nations, industry and stakeholders.
- Key elements of Renewal include:
 - Identification of specific management objectives and Limit Reference Points for Pacific herring;
 - Evaluation of the current and potential alternative management procedures;
 - Review of the current licence fees, licensing and quota system; and
 - Review of the current stock assessment.
- This is a multi-year process and while this work is underway, an interim management approach is required for 2015/16.

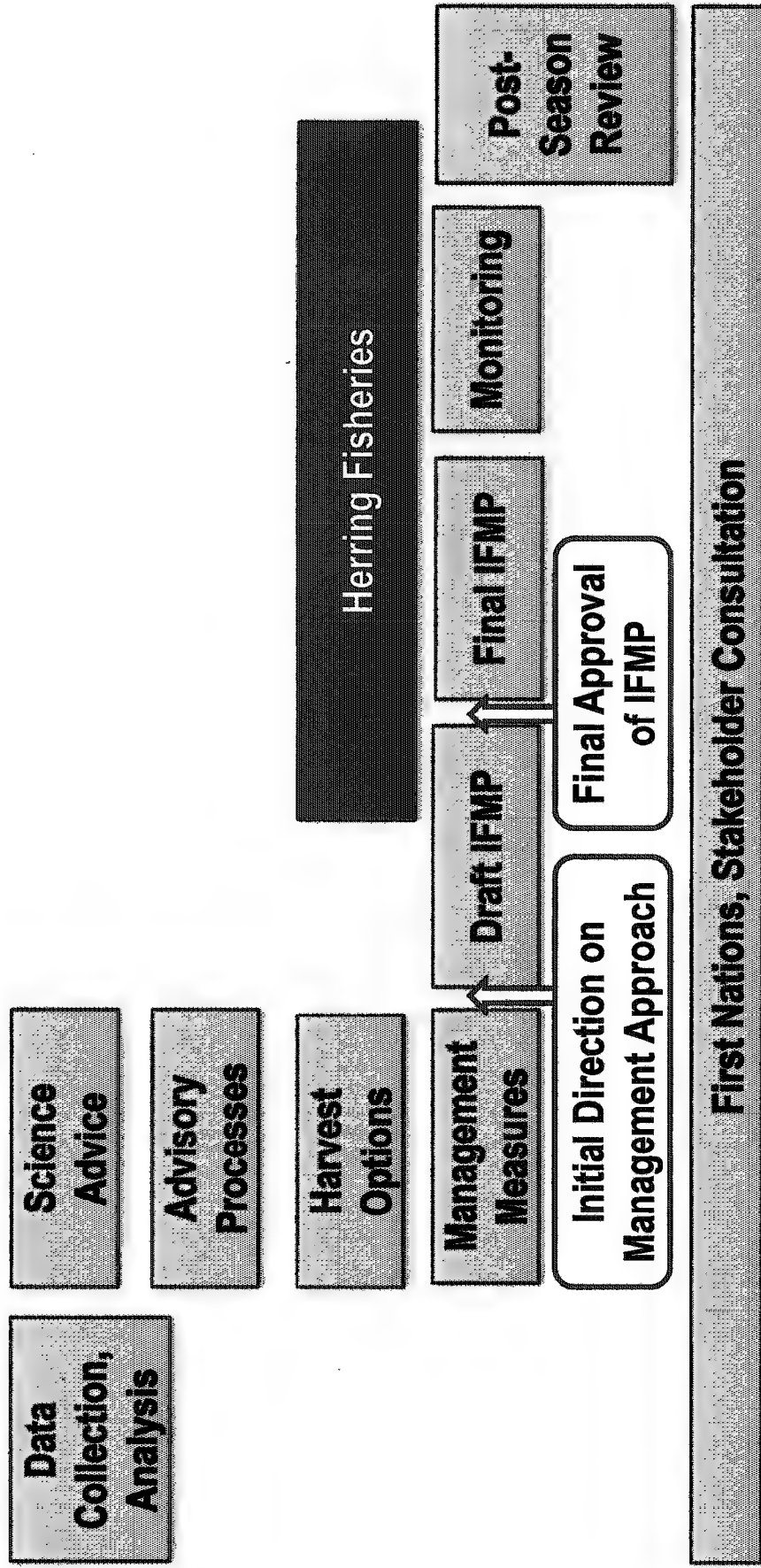


DFO Management Objectives

- Conservation
 - Harvest a portion of the population to ensure continued sustainability of the stocks.
- Ecosystem Processes:
 - Protect herring stocks and their habitat, as well as consider and manage ecosystem impacts using the best available science to inform management decisions.
- Harvest Opportunities:
 - First Nations FSC access on a priority basis, after conservation; and
 - Commercial harvest opportunities in a manner that ensures long-term sustainability of the resource.
- Monitoring and Compliance:
 - Monitor fish stocks and harvest levels through monitoring programs, compliance and enforcement (including mechanisms that are effective and affordable).
- Consultation:
 - Open and transparent consultation process.



Pacific Herring Planning Process



May-Aug September October November December January February March April



DFO Management Framework

Evolution of Decision Rules for Pacific Herring

- In 1983, a 20% Harvest Rate was established for major stock areas.
- In 1986, a commercial cut-off of 25% B_0 (unfished equilibrium biomass) was added as threshold to open commercial fisheries.
- In 2014 and 2015, a 20% target harvest rate was applied for SOG and PRD with 10% for HG, CC and WCVI.
- Current Harvest Control Rule:
 - Below cut-off (25% of B_0) = precautionary management (no commercial fishery)
 - Above cut-off = potential commercial fishery at maximum HR of 20% (or lower) in major stock areas or 10% in minor stock areas



Overview of Science Advice for 2015/16

- Annual stock assessment and science advice completed in October.
 - Since 2013, decision tables used to quantify uncertainty and risk.
 - Risk level of 0.50p was applied in 2013/14 and 14/15
- Stock assessment forecast for each area vary depending on the assessment model (AM) applied.
 - Using the “current model” (estimated q , estimated cut-offs), stocks in all five major stock areas would be above the commercial cut-off.
 - Using the “historical model” (fixed q , fixed cut-offs):
 - WCVI and HG stocks would be below cut-off (at the 0.50p level); and
 - SOG, PRD and CC would be above cut-off.
- The Science Response also included a simulation analysis and evaluation of management procedures (MPs) applied over time.



Fisheries Planning for 2015/16

- DFO is seeking advice and recommendations in order to inform fisheries planning and identification of a management approach for the 2015/16, including:
 - Use of the various assessment models to inform fisheries planning for 2015/16;
 - Potential harvest opportunities in the 5 major stock areas;
 - Harvest rates and risk tolerance (e.g. probability levels) applied when determining potential harvest levels; and
 - Other factors DFO should take into consideration when developing the management approach for 2015/16.



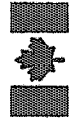
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- **Food, Social and Ceremonial (FSC):**
 - Harvest opportunities provided on a priority basis, after conservation.
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 - Harvest opportunities contingent on “open” areas for commercial harvest and allocations dependent on number of licences in each area.
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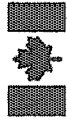
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- Science advice
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Discussion Questions

- How should the results of 2016 forecast and various assessment models be used to inform fisheries planning for 2015/16? Rationale?
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- What is the best way for DFO to engage IHHPC, First Nations, industry and stakeholders in further consultations in advance of the 2015/16 season (e.g. meetings, conference calls, written feedback)?



Timeline & Next Steps

- Following today's meeting, DFO will be:
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Questions? Comments?

Please send any written feedback, advice or requests for additional meetings to:

- Corey Jackson at Corey.Jackson@dfo-mpo.gc.ca or;
- Roger Kanno at Roger.Kanno@dfo-mpo.gc.ca



Pacific Herring Fisheries Planning and Management Approach for 2015/16

Presentation to IHHPC

November 5, 2015



Overview

- The purpose of this presentation is to:
 - Outline the current context for Pacific herring;
 - Identify key considerations and upcoming decisions required for the 2015/16 season; and
 - Seek advice and recommendations regarding an interim management approach for 2015/16, including potential harvest levels.



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- The current context around Pacific herring continues to be challenging, including:
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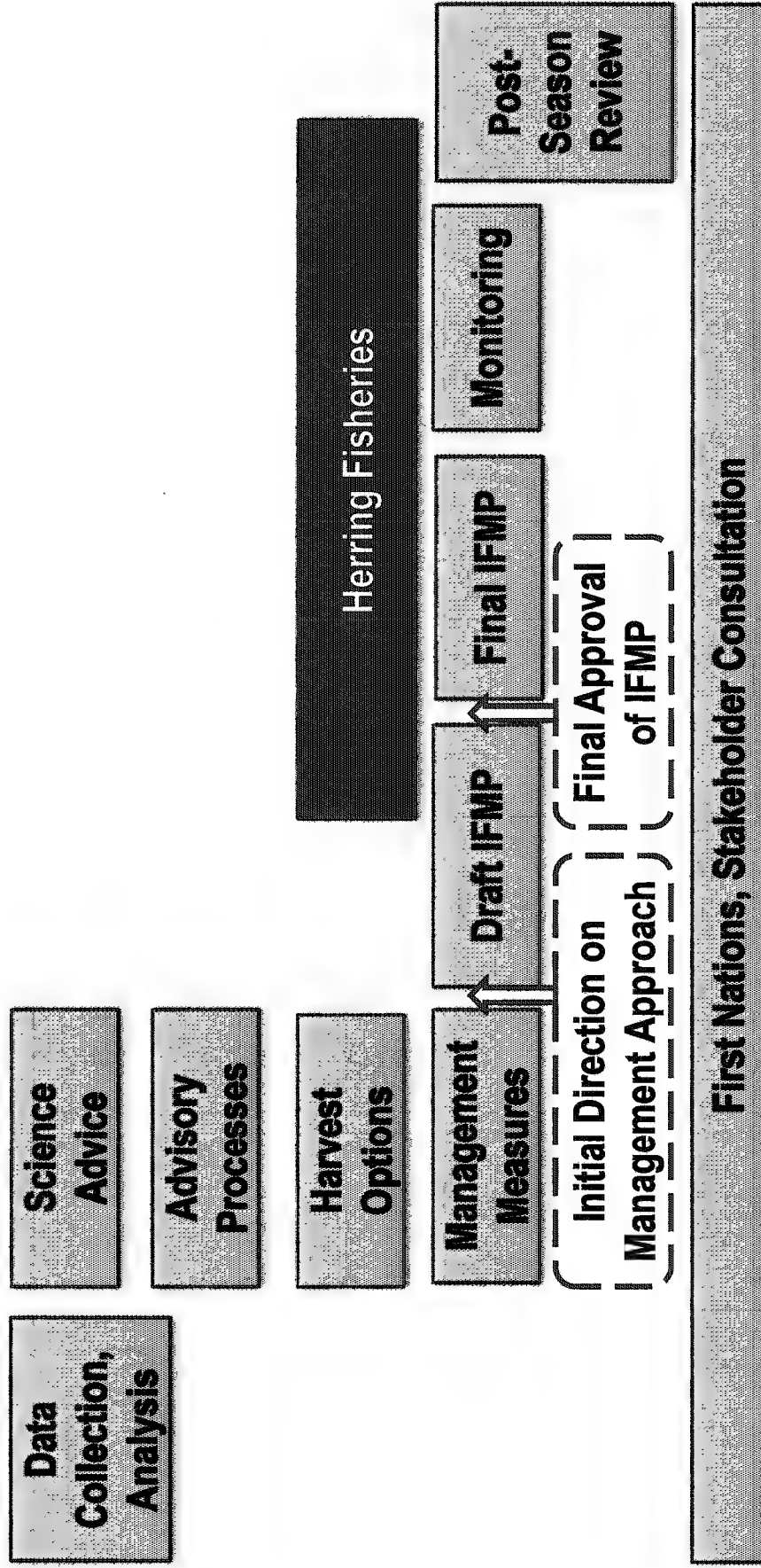


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Pacific Herring Planning Process



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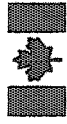
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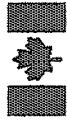
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Heiltsuk-DFO LOU

- DFO signed a Letter of Understanding (LOU) with Heiltsuk Nation in March 2015.
 - Includes a commitment to work together on a joint management plan for the 2016 herring fishery in Central Coast.
- Work to implement the LOU is ongoing, including development of joint objectives and a management plan for recommendation to DFO (Minister) and Heiltsuk leadership, for approval.
 - Technical discussions have also led to additional analysis in the Science Response.
- We are seeking input and advice regarding the Central Coast herring fishery for consideration in the development of a Central Coast management plan.



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- DFO is seeking advice and recommendations in order to inform fisheries planning and identification of a management approach for the 2015/16, including:
 - Use of the various assessment models to inform fisheries planning for 2015/16;
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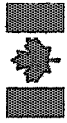
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 - Corey Jackson at Corey.Jackson@dfo-mpo.gc.ca or;
 - Roger Kanno at Roger.Kanno@dfo-mpo.gc.ca

Integrated Herring Harvest Planning Committee: Pre-season meeting

Meeting notes: November 6-7, 2015 • Vancouver, BC

Participants

Corey Jackson (Chair), DFO FM	John Bolton Sr., Heiltsuk
Rebecca Reid, DFO RDG Pacific Region	Roger Kanno, DFO FM
Bonnie Antcliffe, DFO Associate RDG Pacific Region	Brenda Spence, DFO FM
Melissa Evanson, DFO FM	Rob Morley, HIAB/HCRS
Steven Groves, DFO FM	Andrea Goruk, DFO FM
Scott Wallace, David Suzuki Foundation	Mark Fetterly, DFO TAPD
Don Hall, Nuu-chah-nulth Fisheries Department	Greg Thomas, HIAB/HCRS
Penny White, Central Coast Indigenous Resource Alliance	Reg Moody, Heiltsuk/GRS
Paul Ryall, DFO FM	Nathan Taylor, DFO Science
Pierre Courville, DFO Ottawa	Tony Roberts Jr., Native Brotherhood
Chris Cue, HIAB	Dennis Chalmers, BC MoE
Wayne Haldane, Metlakatla Band	Kelly Brown, Heiltsuk
William Benyon, Metlakatla Band	Keith Gladstone, Gladstone Reconciliation Society
Robert Davis Council of the Haida Nation	Floyd Campbell, Ahousaht Fishing Corp.
Walter Cadwallier, SOK	Marion Campbell, Ahousaht Fishing Corp.
Don McNeil, SOK	Grant Watts
Russ Jones, Technical Director Council of the Haida Nation	Michael Swan, Ahousaht Fishing Corp.
Jaclyn Cleary, DFO Science	Les Sanderson, DFO C&P

Meeting objectives:

- Review and discuss the Pacific Herring Stock Assessment and Forecast for 2015/16;
- Provide an update on DFO herring science and fisheries management;
- Seek input and advice regarding the management approach for 2015/16, including potential harvest levels, risk tolerance and key considerations for each management area;
- Seek input and advice to inform development of the 2015/16 Integrated Fisheries Management Plan (IFMP), including management measures and fishing plans for: Food & Bait herring; Roe herring; Spawn-on-Kelp; Special Use herring and Aboriginal fisheries;
- Provide an update on Pacific Herring Renewal and seek advice on a process to engage IHHPC, First Nations, industry and stakeholders going forward.

Introductions and opening remarks

Following introductions, the Chair introduced the Associate Regional Director General for opening remarks.

Opening remarks

Bonnie Antcliffe, DFO

Bonnie Antcliffe, the Associate Regional Director (DFO) provided opening remarks, noting the last two seasons have been particularly challenging for Pacific herring and that the Department is undertaking a comprehensive review of the management framework for Pacific herring. She highlighted work to date, including workshops with First Nations and industry, a CSAP meeting to receive advice on candidate

Integrated Herring Harvest Planning Committee: Pre-season meeting

Meeting notes: November 6-7, 2015 • Vancouver, BC

LRPs and a simulation tool to evaluate management procedures, a science symposium co-hosted with the Ocean Modelling Forum and formation of a Pilot Technical Working Group to help inform this year's stock assessment.

Ms. Antcliffe noted there is still much work required for Renewal of the framework and that collaboration and engagement with First Nations, industry and other stakeholders will be critical to this work. In terms of planning for 2015/16, the approach will be interim in nature while broader work around Pacific herring renewal continues. The approach will be informed by science advice provided in 2015 and consultation with all participants including ongoing discussions with Heiltsuk, Haida, NTC, other First Nations and industry, as well as direction from the new Minister. DFO is targeting release of a draft plan in December.

The Chair reviewed the agenda and meeting objectives which were followed by general discussion.

Discussion

- A HIAB representative asked whether the more extensive stock assessment process and later science advice as well as the election and appointment of a new minister will delay decision making and what is the likelihood of having an IFMP by December.
 - DFO: Herring has been identified as a priority for the incoming Minister and the Deputy Minister is aware of the urgency and we will be doing everything on our end [at the regional level] to meet this timeline.
- Funding for the science survey was identified as a critical element of herring management by several participants which requires securing long term, multiyear funding for the survey program so that there is confidence in the data collected and the stock assessment each year and also so that effort can be concentrated on discussing renewal of the framework rather than worrying about whether there will be funding available each year for the survey.
- An NTC representative noted that a review of the model used in the stock assessment should also be included as a consideration for renewal of the framework and decision making.
- Several participants commented on the inadequacy of the meeting notes. While they capture an adequate level of detail of the proceedings, it was suggested that they do not adequately reflect the positions of participants and resultant action items. Another participant remarked that detailed meeting notes are not conducive to an open forum for discussion as positions of participants could be inaccurately recorded in the minutes and could more easily and accurately be provided by the participant themselves.
 - DFO: Committed to reviewing the Terms of Reference for the IHHP and the format for meeting records based on feedback from the Committee and those used in other advisory processes. There is also a need to continue this conversation and discuss how this advisory process will inform the renewal of the framework and set out timelines for this process.

Presentation: Overview of Science To Date

Integrated Herring Harvest Planning Committee: Pre-season meeting

Meeting notes: November 6-7, 2015 • Vancouver, BC

Nathan Taylor, Science Branch (DFO) gave a presentation describing the stock assessment process and science advice for 2015/16 (CSAS approved simulation tool, formation of Pilot Technical Working Group and a Science Response instead of a Working Paper and Science Advisory Report): see PowerPoint for additional details.

Discussion

- A HIAB representative asked if the difference in performance [in meeting the standard objectives in the simulations] between the two assessment methods, AM1 and AM2, was statistically significant as Sean Cox, the lead investigator from Landmark Fisheries Research said the differences were small.
 - DFO: The statistically significant paradigm is not used in this type of simulation analysis, but yes, the differences were relatively small.
- A Haida representative asked a question regarding M (natural mortality) in the simulation which was based on historical measures of M, while the simulations presented in the Science Advisory Report at the May CSAP meeting assumed M to be similar to current measures of M or to be increasing.
 - DFO: This was a limitation of the simulation in the Science Response where only historical measures of M were used, this resulted in reducing risk by fishing at half the rate with AM2 (assessment model 2) in this case, but this was just the first round of simulation.

Presentation: Stock Assessment for 2015/16

Jaclyn Cleary, Science Branch (DFO) delivered a presentation providing the results of the stock assessment program including stock trends, 2015 biomass estimates and 2016 projections using two models (the current, AM1 and historical, AM2): see PowerPoint for additional details.

Discussion

- DFO: The provision of advice using 2 assessment models is an interim approach and not where we want to stay i.e. being without a package to inform choosing between the two models, but the assessment (including the simulations) does help to inform this process.
 - Choosing a specific management procedure requires refinement of objectives to rank procedures based on the outcome of simulations.
- A Haida representative stated that more engagement is required to define objectives that are relevant to local communities and that Haida also have cultural objectives which require more discussion.
- An SOK representative asked what the reason was for changing the science (i.e. going back to AM2 vs. AM1).
 - DFO: There has been a lot of feedback regarding the new model in that the projections are thought to be too high and that people are not seeing the returns that are being forecast for their areas.

Integrated Herring Harvest Planning Committee: Pre-season meeting

Meeting notes: November 6-7, 2015 • Vancouver, BC

- There was support expressed for a tagging program by some participants.
 - DFO: Work of this nature could be considered by a science subcommittee, not the Pilot Technical Working Group which is focussed on the stock assessment, but for a more forward thinking group that considers additional science work which may be required.

Presentation: Pacific Herring Fisheries Planning and Management Approach for 2015/16

Corey Jackson, Fisheries Management (DFO) provided information regarding the key considerations for upcoming decisions for an interim management approach for the 2015/2016 season and to seek recommendations from participants: see PowerPoint for additional details.

Discussion

- A Heiltsuk representative stated that similar to last year, support for a commercial roe herring fishery in Area 7 would be unlikely as their rights to a commercial SOK fishery are not being adequately met. Representatives for NTC and Haida stated that stocks may be increasing, but they are still not seeing significant returns in many parts of their traditional areas resulting in a lack of success in FSC fisheries so there would be no support for commercial fisheries in their areas.
- An NTC representative noted that the wording for one of the DFO objectives regarding “conservation” was unclear and may need to be revisited.
- DFO: We will be revisiting and likely revising these objectives for the 2015/16 IFMP.

RDG remarks on Pacific Herring Renewal and the management approach for 2015/2016

Rebecca Reid, DFO

Rebecca Reid, the Regional Director General, Pacific Region (DFO) provided additional comments on renewal of the management framework for Pacific herring and lead a short discussion. She stressed the importance of renewal and that tangible progress has been made through science (CSAP paper on candidate limit reference points, science symposium and simulation in the 2015/2016 stock assessment Science Response), but that management considerations are also important and need to be scoped out as part of the renewal process.

Discussion

- An NTC representative asked what the Department’s position is on the management approach for 2015/2016.
 - DFO: The Department is currently reviewing the science advice, as well as consultations to-date and potential options regarding the approach for 2015/16. No decisions have been made to-date.

Integrated Herring Harvest Planning Committee: Pre-season meeting

Meeting notes: November 6-7, 2015 • Vancouver, BC

- A HIAB/HCRS representative commented that the IHHPC is often a venue for people to come forward and present their positions and is not necessarily an ideal forum to discuss objectives, but is willing to have that discussion.
- A Haida representative expressed hope that there would be a time when they would not have to come to this table and simply put forward a position and a Heiltsuk representative expressed a willingness to work with others including with industry.
 - DFO: We have presented some potential options for 2015/2016 fisheries planning, but are still asking for your advice and recommendations. Depending on how the science advice is applied (e.g. AM1 vs. AM2), there are different harvest options that could be considered. Is there some option based on feedback from participants that might be better than anything that is being considered by the Department that could reduce the risk of protest or legal action for example.
- There was discussion regarding how to move the IHHPC away from an adversarial, “positional” forum to a more collaborative process with dialogue around issues and potential solutions.

Presentation: Preliminary Information on 2015/2016 Commercial SOK Plan

Steven Groves, North Coast (DFO) provided an overview of the commercial fishing plan for the Spawn On Kelp fishery: see PowerPoint (*Preliminary Information on 2015/2016 Fishing Plans*) for additional details.

Discussion

- The Department indicated that a request has been received to move an SOK licence from the HG area to the PRD area which was confirmed by a representative of the Metlakatla First Nation. This is not something that the Department would normally consider (not a normal process), but is being brought forward as a fishery participant has requested it.
- Another SOK representative commented that he and likely some other SOK licence holders would be interested in relocating as well so any reselection of areas should be open to all SOK licence holders.
- It was noted that some SOK licence holders have commented at past IHHPC meetings that their areas are already at capacity for SOK operations. Also, increasing quotas for SOK would mean that there is less fish available to allocate to the roe fishery.
- An Ahousaht representative stated that there was an understanding and it was accepted amongst SOK licence holders that licences could not move between areas as this was a source of many problems in the past.

Day 2 (Friday, November 7, 2015)

Presentation: Preliminary Information on 2015/2016 Aboriginal Fishing Plan

Roger Kanno, Fisheries Management (DFO) provided an overview of the 2015/2016 Aboriginal Fishing Plan: see PowerPoint (*Preliminary Information on 2015/2016 Fishing Plans*) for additional details.

Discussion

- There was discussion regarding the suitability of the term “expected use” in both its definition and application to Aboriginal fisheries. Although the 35 tons of expected use attributed to 16,000 pounds of SOK product harvested by open ponding and 100 tons of expected use by closed ponding characterizes the biological impact of this fishery, it does not adequately describe the amount of herring that is required for successful harvest.
 - DFO: There are several items that need to be addressed; the amounts that First Nations are expecting to harvest and their requirements, the impact that this has on the stocks and including it in the stock assessment and the amounts required for successful aboriginal fisheries. These items can be prioritized and added to the list of issues for science and fish management to consider.

Presentation: Preliminary Information on 2015/2016 Commercial Roe Herring Plan

Brenda Spence, South Coast (DFO) provided a summary of the key elements of the preliminary Commercial Roe Herring fishing plan: see PowerPoint (*Preliminary Information on 2015/2016 Fishing Plans*) for additional details.

Discussion

- A Haida representative commented that the incidental mortality from releases of herring from the seine fishery may be assumed to be low, but it could be higher in the gill net fishery and suggested that this should be investigated and could be added as a source of mortality in the assessment model.

Presentation: Preliminary Information on 2015/2016 Commercial Food and Bait Plan

Brenda Spence, South Coast (DFO) provided a summary of the key elements of the preliminary Commercial Food and Bait fishing plan: see PowerPoint (*Preliminary Information on 2015/2016 Fishing Plans*) for additional details.

Discussion

- An MCC representative asked for clarification regarding the proposal to allow quota from the roe fishery to be moved into the food and bait fishery.

Integrated Herring Harvest Planning Committee: Pre-season meeting

Meeting notes: November 6-7, 2015 • Vancouver, BC

- DFO: Yes, it was part of the IFMP last year and is being considered again for this season to allow for roe seine licences to opt at the time of roe area selection, to harvest in the food and bait fishery.

Presentation: Preliminary Information on 2015/2016 Commercial Special Use Plan

Roger Kanno, Fisheries Management (DFO) provided a summary of the key elements of the preliminary Commercial Special Use herring fishing plan: see PowerPoint (*Preliminary Information on 2015/2016 Fishing Plans*) for additional details.

Discussion

- DFO: The Department has received a request from the A'tlegay First Nation for access to the Special Use fishery. This request cannot be fulfilled through the ATP or PICFI programs due to the open access nature of this fishery. The complex nature of the current licensing system makes it difficult even for current participants to access quota for sport bait operations.
 - The Department would appreciate any feedback, but is working on potential options to address A'tlegay's request and also to streamline the licensing process for all participants and report back to the IHHP.

Presentation: Pacific Herring Renewal

Corey Jackson, Fisheries Management (DFO) provided an overview of Pacific Herring Renewal including work to date and potential options for engaging the IHHP in next steps: see PowerPoint (*Pacific Herring Renewal: Process Options, Considerations and Next Steps*) for additional details.

Discussion

- Response to Pacific Herring Renewal was generally positive, but there were many questions and points of discussion:
 - What is the timeline and process?
 - Funding and process support will be critical which could include an outside facilitator (several participants expressed the view that the Commercial Salmon Allocation Framework process has worked well and a similar process could be used for Pacific Herring Renewal)
 - The Pilot Technical Working Group is a good first step, but there was broad support for a committee to examine the funding requirements and the scope of the stock assessment survey as core assessment activity is critical.
 - A separate steering committee to direct renewal will also be required.
 - The process will require a phased approach with continued bi-lateral meetings as well as talks with the broader group.

Integrated Herring Harvest Planning Committee: Pre-season meeting

Meeting notes: November 6-7, 2015 • Vancouver, BC

- DFO: We are encouraged by the response and the timeline and process will depend on many factors including input from this group. Additional funding has not been identified, but there is a commitment both in the region and from Ottawa to move this process forward with the desire for some progress to be made by as early as next year.
- An MSE process for Pacific Herring Renewal will likely be much more complex than other recent MSE processes and will be a lengthy process.

Action Items / Next steps

- DFO to distribute presentations, current IHHP terms of reference and draft meeting record.
- DFO to follow up on establishment of steering committees, technical committees and/or sub-committees , including:
 - A committee to steer renewal (including First Nations, industry and stakeholders);
 - A technical working group to inform renewal (potentially building on the Pilot Technical Working Group created in 2015); and
 - Sub-committee to review and provide advice/recommendations regarding the annual herring survey program's scope and funding requirements.
- DFO to review the Pilot Technical Working Group including a debriefing with participants and recommendations for 2016/17.



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2016/2017 ROE HERRING PLAN

SEASON REVIEW



May 11, 2017

Integrated Herring Harvest Committee Meeting

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INTRODUCTION: For each area:

-Resources

-Stocks and spawn (where available)

-Commercial fisheries: seine and gillnet

1. Strait of Georgia
2. Prince Rupert
3. Haida Gwaii
4. Central Coast
5. West Coast Vancouver Island



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COASTWIDE OVERVIEW

Assessment Programs

- **Test sample collection and dive surveys:** Coastwide contract between DFO and the Herring Conservation Research Society, and AFS Central Coast program. Also industry funded test vessels in SOG.
- **First Nations charters and coordinator** programs in several areas of the coast.
- **Fishery Monitoring Program:** JO Thomas & Associates: provides dockside catch validation, and at sea observers for seine and gillnet fisheries. (Funded by industry).



Stock Soundings and Spawn Distribution

Stock soundings are limited by a number of variables such as:

- Effort (Number of platforms and days of effort)
- Weather/access to areas to assess
- Experience of vessel master and equipment used.
- Distribution of vessels in relation to fish holding and spawning patterns.
- Timing of platforms and flights in relation to spawn timing

The 2017 spawning stock abundance estimates will be determined by the spawn survey data and available in fall 2017



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Roe Herring Overview: 2017

- For the third season, roe seine licence holders had the option to select harvest in the SOG and PRD food and bait fisheries instead of the roe seine fishery during the roe herring area selection process.
- The initial food and bait allocations increased after the roe seine licence holders had completed their applications and area selections and opt to harvest in the food and bait fishery.
- The SOG roe fishery seine allocation was reduced by the same amount that the food and bait fishery quota was increased.



Roe Herring Overview: Changes for 2017

- Strait of Georgia spawn criteria for commercial roe herring opening in Areas 15 and 17 South. (*One mile of spawn for minimum 24 hours or two miles of spawn*)
- PRD and SOG roe herring seine and gillnet pool licences issued with Central Coast equal share of available quota.

Coastwide Quotas and Catch

	Seine		Gillnet	
	Quota	Catch	Quota	Catch
HG	Closed		Closed	
PRD	1,000	1,124	1,500	1,541
CC	215	0	Closed	
SOG	13,013	9,695	15,172	10,166
WCVI	Closed		Closed	



Area: Strait Of Georgia - Resources

- Platform CCGC Neocaligus – Feb 22 to Mar 18
- Dive charters Ocean Cloud and Viking Spirit
- Test vessel Denman Isle 30 days
- Spawn aircraft flights: 24
- First Nations Communication Coordinator



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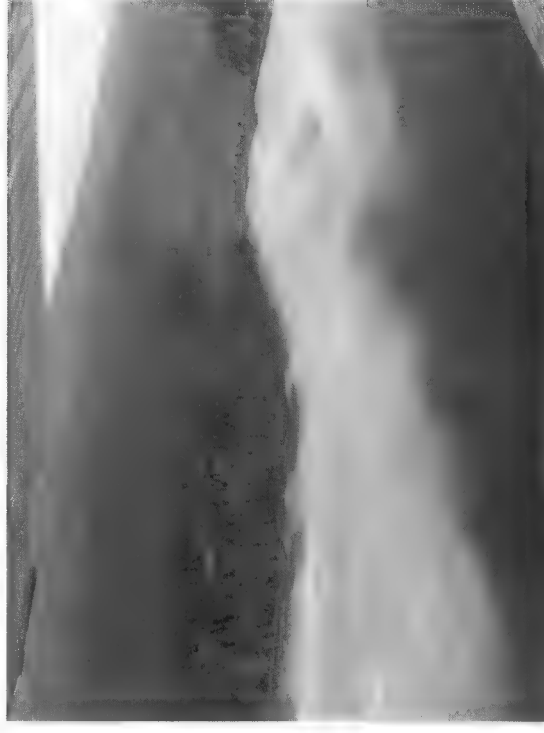
Area Strait of Georgia – Stocks and Spawn

Soundings:

- 80,000 tons - Estimate based on test vessel soundings

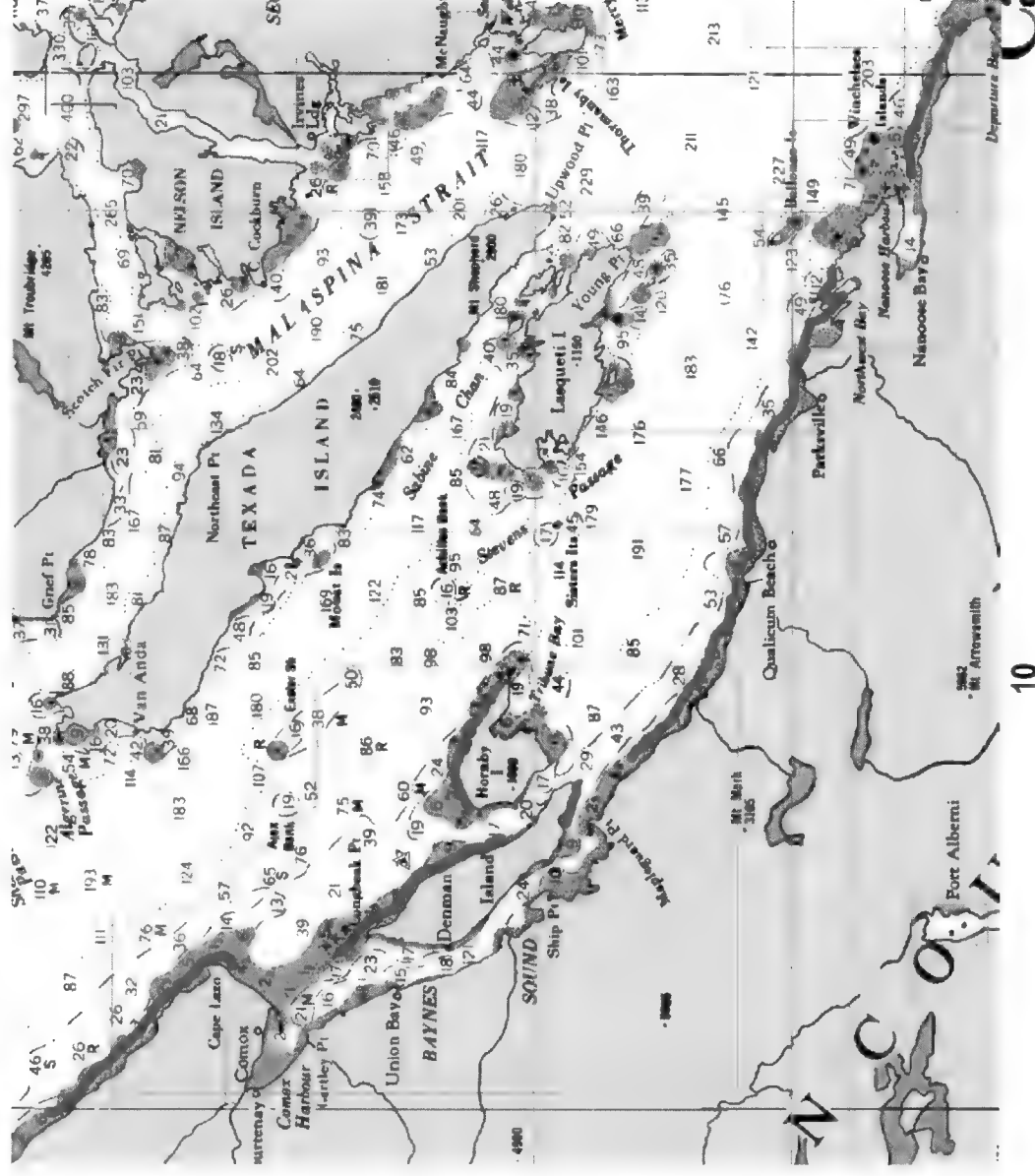
Observed Spawn:

- First spawn Mar 4
- 54 linear nautical miles recorded by aircraft (62 in 2016, 74 in 2015)



Area: Strait Of Georgia Spawn

Mar 4 to April 3





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Area Strait of Georgia – Seine Fishery



- **Quota:** 13,013 short tons
- **Catch:** 9,695.4 short tons
- **Fishing Dates:** March 6, 8, 9, 10,
11, 12
- **Number of licences:** 175
- **Average:** 74.360 tons per licence
- **Licensed Pools:** 8



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**Table 2. 2017 STRAIT OF GEORGIA SEINE
FISHING AREA, CATCH, AND EFFORT, BY DATE**

DATE	PFMA	# SETS	# SETS WITH FISH	# SETS KEPT	AVE SET SIZE	END OF DAY HAILED CATCH	VALIDATED CATCH (TONS)
2017-Mar-6	14-13	30	18	18	138	2,480	2,571.100
2017-Mar-8	14-3	38	19	18	168	3,025	3,202.695
2017-Mar-9	14-8	17	8	7	169	1,185	1,260.346
2017-Mar-10	14-8	49	21	21	84	1,765	1,862.536
2017-Mar-11	14-8	21	7	7	94	659	673.976
2017-Mar-12	14-8	4	3	1	105	105	124.781
Totals		159	76	72		9,219	9,695.436

Area Strait of Georgia– Seine Fishery

Notable for:

- Lower than expected pre-fishery soundings.
- Good fish quality over six days of fishing at Cape Lazo and in lower Baynes Sound.
- Weather constrained sounding and fishing efforts
- 31 industry test fishing days were utilized for seine and gillnet fishery support.
- New measure of inseason spawn criteria for opening in 15 and 17 South not needed/utilized



Strait of Georgia Gill Net Fishery Summary

- **Gill net Quota: 15,172 tons**
- **Gill net Catch: 10,166 tons**
- **11 Pools, 812 Licenses, Quota per license 20.149 tons.**
- **Gillnet Fishery Opening: 11:00hrs Mar 4 to 16:00 hrs Apr 4.**
- **Main portion Mar 4 – Mar 10: Fishery began in Parksville Bay and extended North to Mapleguard Point and then in the Comox area from Willemar Bluffs to north of the Little River Ferry terminal. Estimated catch approx. 8,460tons.**
- **Secondary Mar 15 – Mar 18: Fishery occurred on the east coast of Denman Island in the Komias Bluff and Fillongley areas and on the east coast of Hornby Island from Shields Point to Collishaw reef. Estimated catch approx. 1,755tons.**
- **Tertiary Mar 31 – Apr 1: Fishery occurred in the Nanaimo Area from Icarus Point to Blunden Point and in Hammond Bay. Estimated catch approx. 95tons.**



Area: Haida Gwaii - Resources

- Management Platform – None available
- Roe Test Charter – Queens Reach: 25 days (Mar 9 to Apr 2)
- Spawn Recon. Charter – Haida Guardian: 19 days (Apr 1-19)
- HG Spawn Dive Charter - Haida Spirit: 19 days (Apr 6 – 25)
- 2W Surface Survey Charter – Atlas: 6.5 days (Mar 30 – Apr 5)
- Haida AFS Patrol – Haida Guardian: 4 Days (April 17 - 20)



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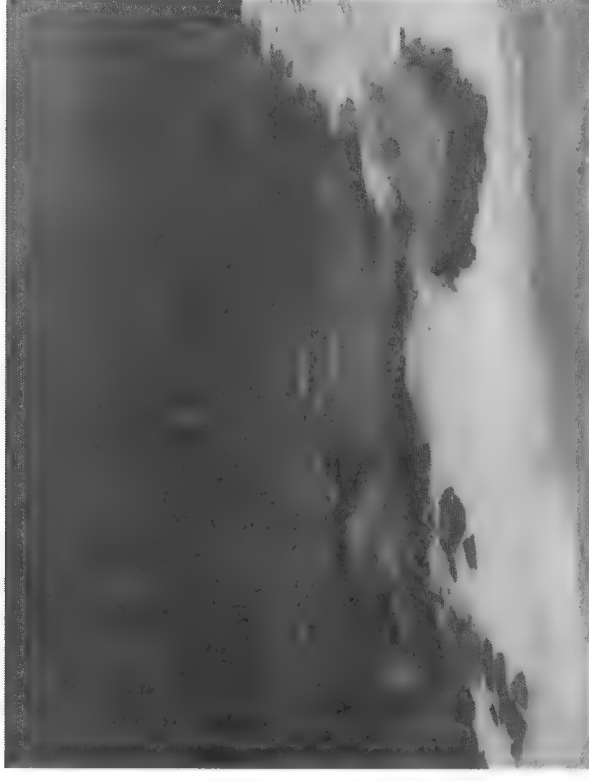
Area: Haida Gwaii – Stocks and Spawn

Soundings: (based on test vessel soundings)

- HG Stock Area = 11,800 tons
- 2W Minor Area = 7,750 tons

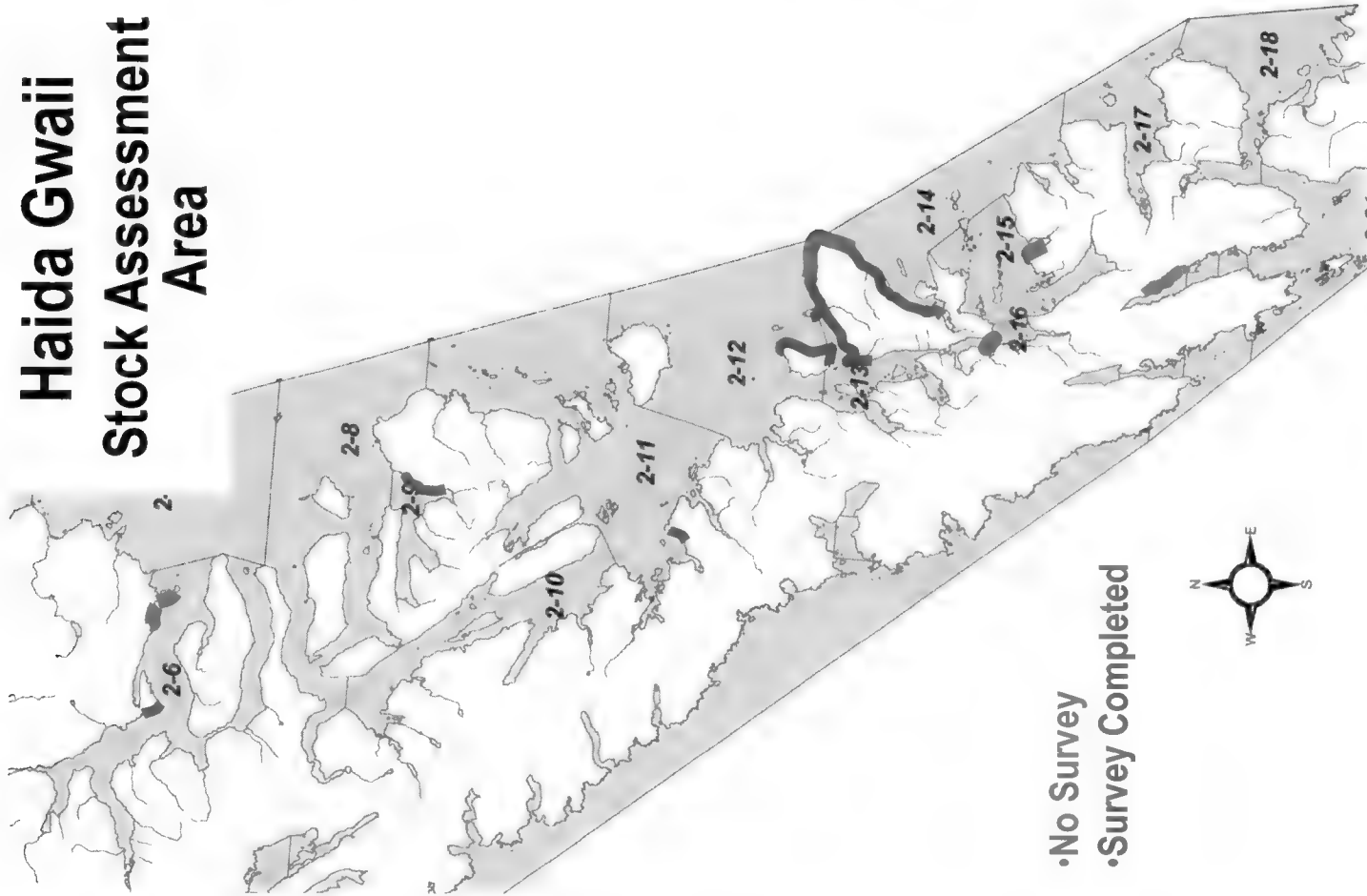
Observed Spawn:

- HG Stock Area
 - Spawns observed Mar 5 – Apr 18
 - 25.4 nmi (47.1 Km) spawn observed (22.5 nmi in 2016, 29.4 nmi in 2015)
- 2W Minor Area
 - No Spawns observed Mar 30 – Apr 5



Haida Gwaii

Stock Assessment Area



Location	Soundings	Spawn
Selwyn Inlet	700 t	1.8 nmi (3.4 Km)
Atli Inlet	250 t	1.3 nmi (2.4 Km)
Juan Perez	200 t	0.6 nmi (1.1 Km)
Burnaby	8,500 t	19.0 nmi (35.1 Km)
Skincuttle Inlet	1,350 t	1.5 nmi (2.8 Km)
Collison Bay	NFF	
Louscoone Inlet	800 t	1.2 nmi (2.2 Km)
TOTAL:		11,800 t 25.4 nmi (47.1 Km)





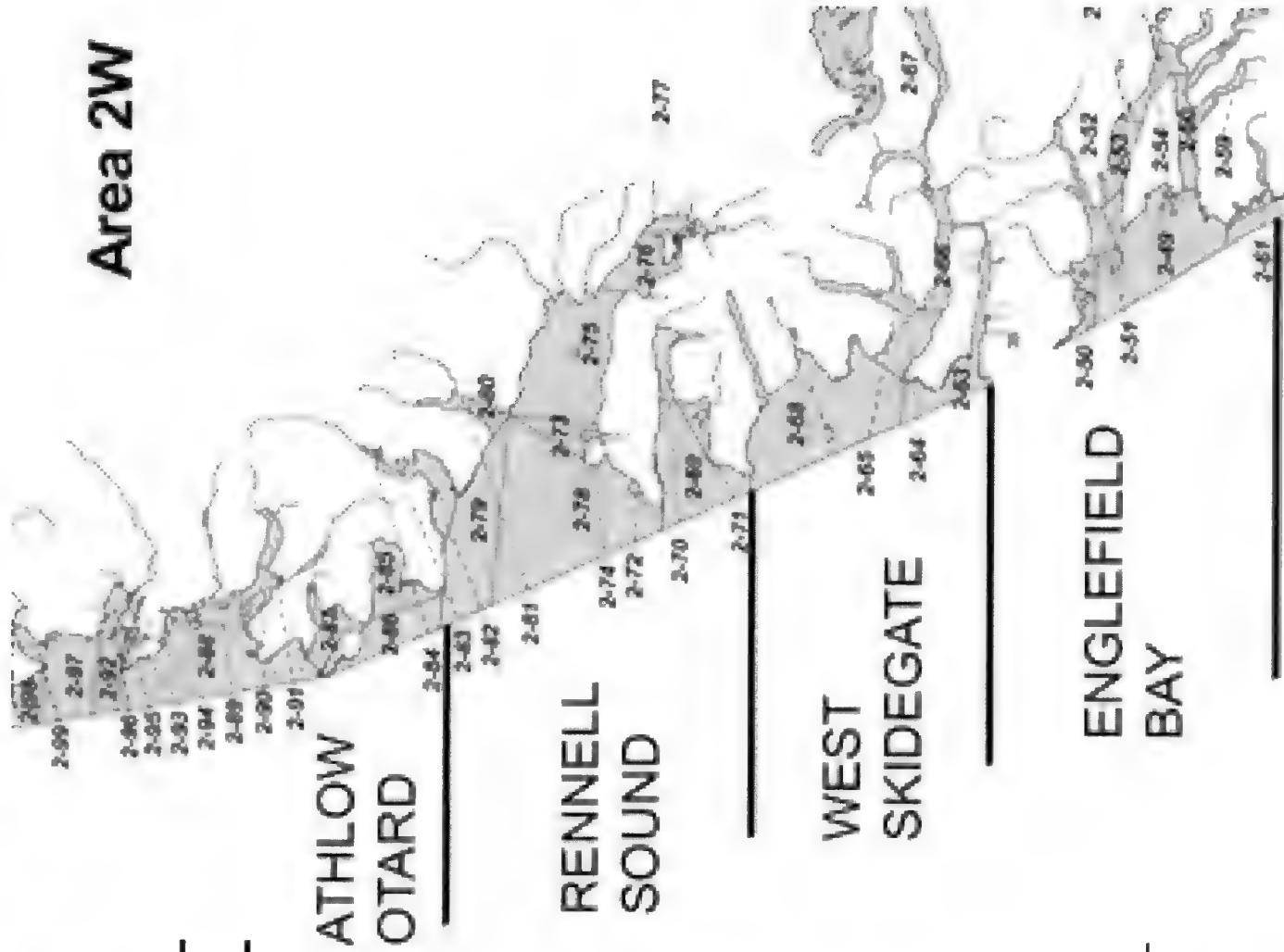
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Area 2W Minor Stock Area

Location	Soundings	Length
Port Louis	3500 t	No Survey
Port Chanal	2000 t	No Survey
Seal Inlet	Scr.	No Survey
Kano Inlet	300 t	No Survey
West Skidegate	Scr.	
Inskip Channel	1900 t	No Survey
TOTAL:		7,700 t
		No Spawn Observed

Area 2W





Area: PRD Gillnet

Stock assessment charter: Nita Maria

- Big Bay Gill net Quota: 1500t
- Final Gill net catch: 1541t overage of 2.7%
- 456 GN licenses: 3.3t / licence.
- Herring Charter start: March 15, 2017
- Herring Charter finish: March 27, 2017

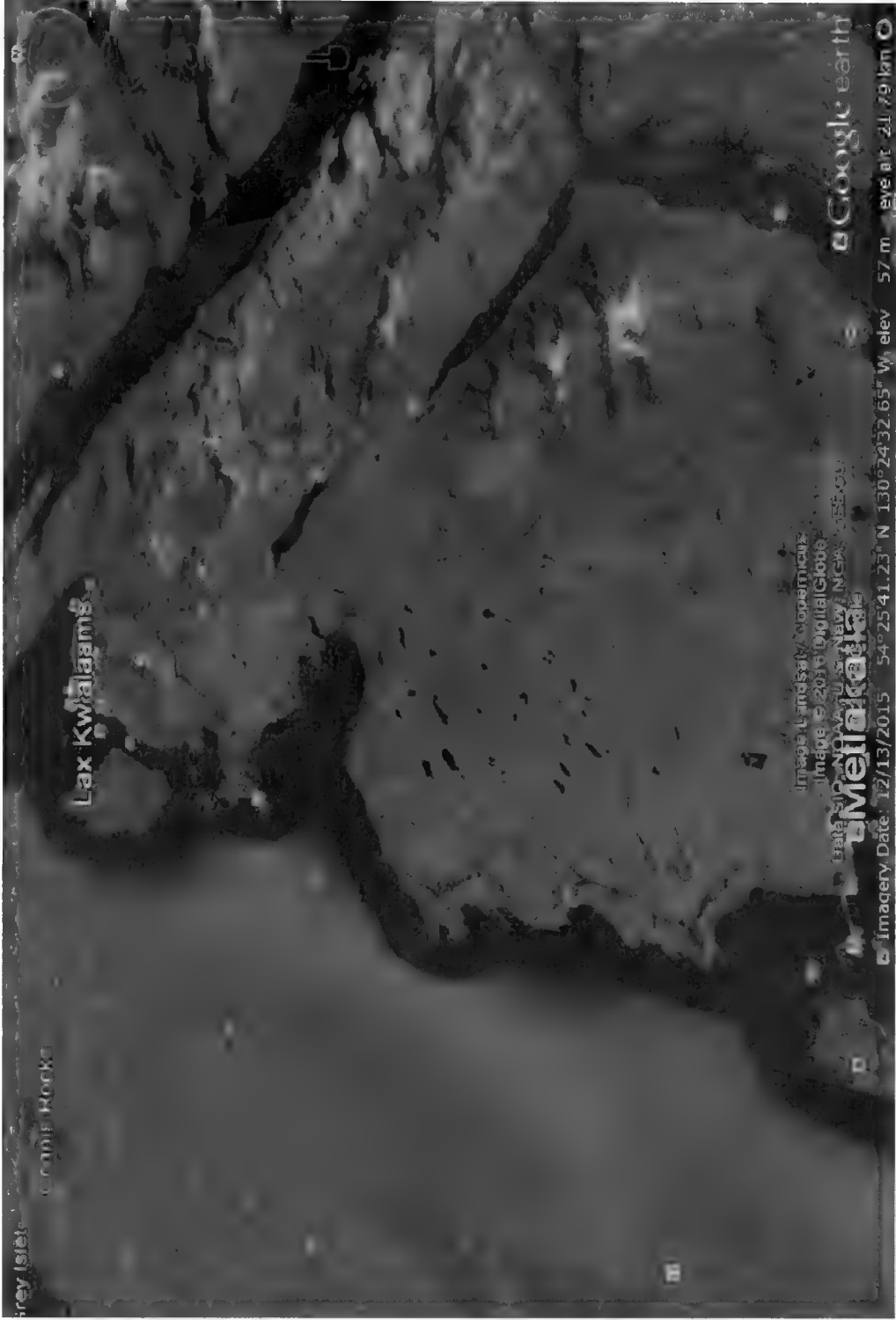
Dive charter: Royal Pride.

- Start March 27, 2017
- Stand down days: April 12 & 13, 2017
- End April 17, 2017



Area: PRD Gillnet

- **Spawn Assessment:**
Approximately 37.49 km (see Map)
- **Fishery:**
- Spawn was first observed on March 16 west of Tree Bluff, fishery was opened March 17 1500 hrs after the gill net test of 13% and the required mile of spawn was observed off of Tree Bluff. Fishing was isolated to Tree Bluff and the southern shore leading into Big Bay due to active spawn and strong southerly winds. Peak punt count reached 20 vessels. Fishery closed March 21 1000 hrs with quota achieved.
- **Challenges:** Fish were holding tight to the beach limiting sampling opportunities.





Area: PRD Seine Fishery

Kitkatla (Area 5)

- Number of Licenses: 52
- Quota: 1,000 tons
- Management Platform MV “Franciscan No.1”
 - March 14th to March 27th
- Estimated soundings 3,500t
- SOK operation at North end of Gurd Pt (3 licenses)
- FSC on the eastside of Gurd Island



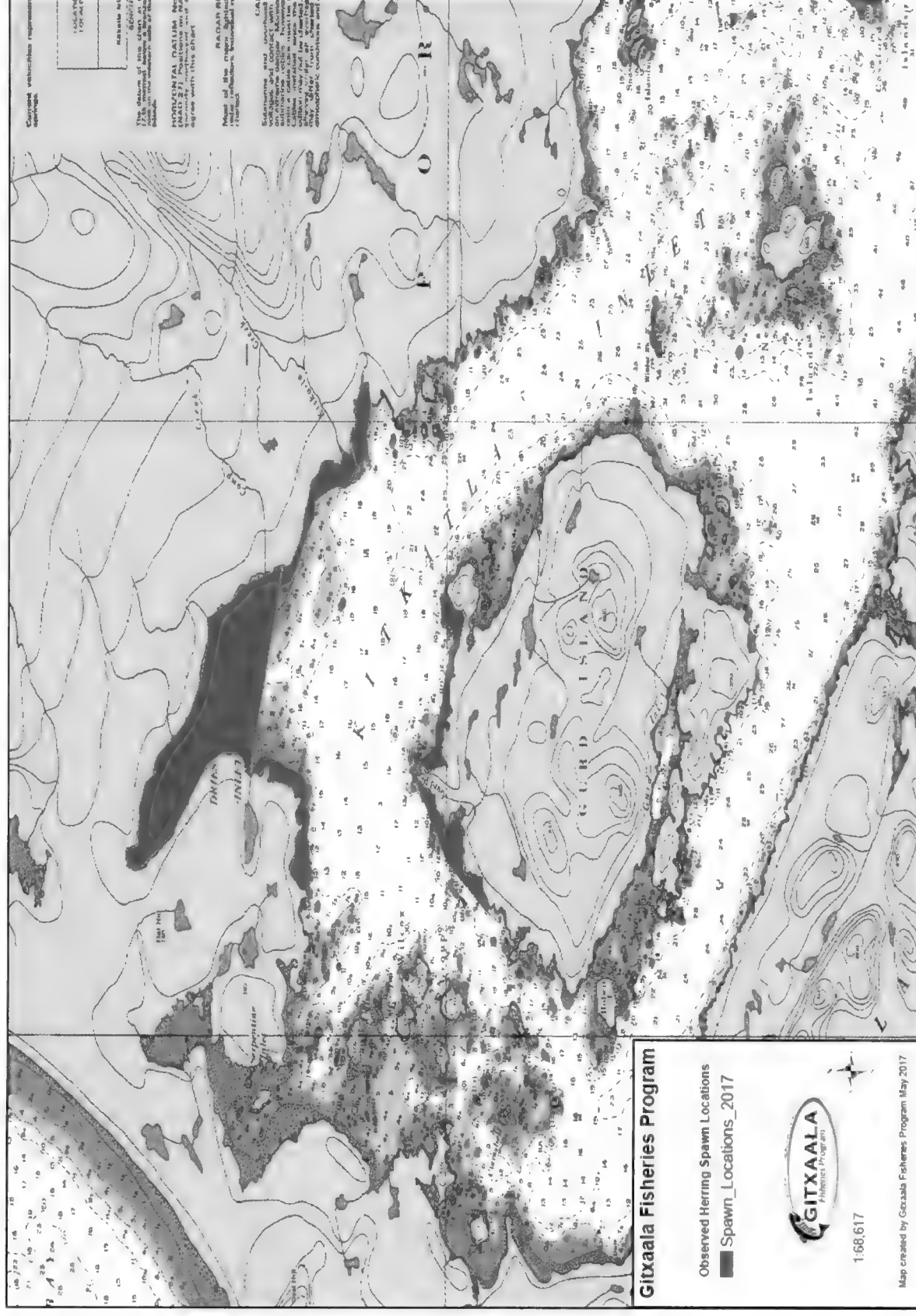
Area: PRD Seine Fishery

- Catch: 1,124 tons of 1,000 tons quota
- Open: 07:11 hrs March 23rd, 2017
- Closed: 18:40 hrs March 23rd, 2017
- PFMA: 5-5 and portions of 5-4, 5-8 and 5-9
 - Northeast side of Gurd Island
- 9 vessels made 7 sets .
 - 2 had zero catch.
- All sets were pumped.



Area: PRD Kitkatla –Spawn

- Spawn was observed around Dries Inlet and around Gurd Point.
- The spawn started on April 2nd – April 5th
- Total spawn approximately 11 kms
- Comments from dive charter that the spawn length was fairly short compared to most years but the layers were very good and the width was longer than usual.



Area: Central Coast (Areas 6 to 8)

- Platforms:
 - F/V Franciscan No. 1 (Mar 1-10),
 - F/V Proud Canadian (Mar 15-Apr 4)
 - CCGS Vector (Mar 17 - Apr 6)
 - F/V Franciscan No. 1 (Mar 27-30)
- Estimated sounding in the area was 16,000t on Mar 31
 - significant increase from 9900t on March 26th
- Equal share for all eligible seine licences (coast wide)
- Quota: 215 tons
- No SN roe fishery occurred in 2017.



Area: CC – Spawn

- Significant spawns were observed in
 - Kitasu Bay
 - Ivory Island,
 - Seaforth Channel,
 - Lombard Inlet,
 - Cecilia Island,
 - Spiller Channel (Apr 3) up to Neekas Inlet (shallower
this year – down to 35ft)



Area: CC – Spawn

- Spawn reported to be less than the last two years.
- Many sea urchins are reported which impacted kelp abundance.
- No fungus on the spawn was observed and may be connected to the cooler water temperatures (4 to 6 degrees).
- The two spawn charter vessels were adequate to cover all the spawns reported.



Area: WCVI - Resources

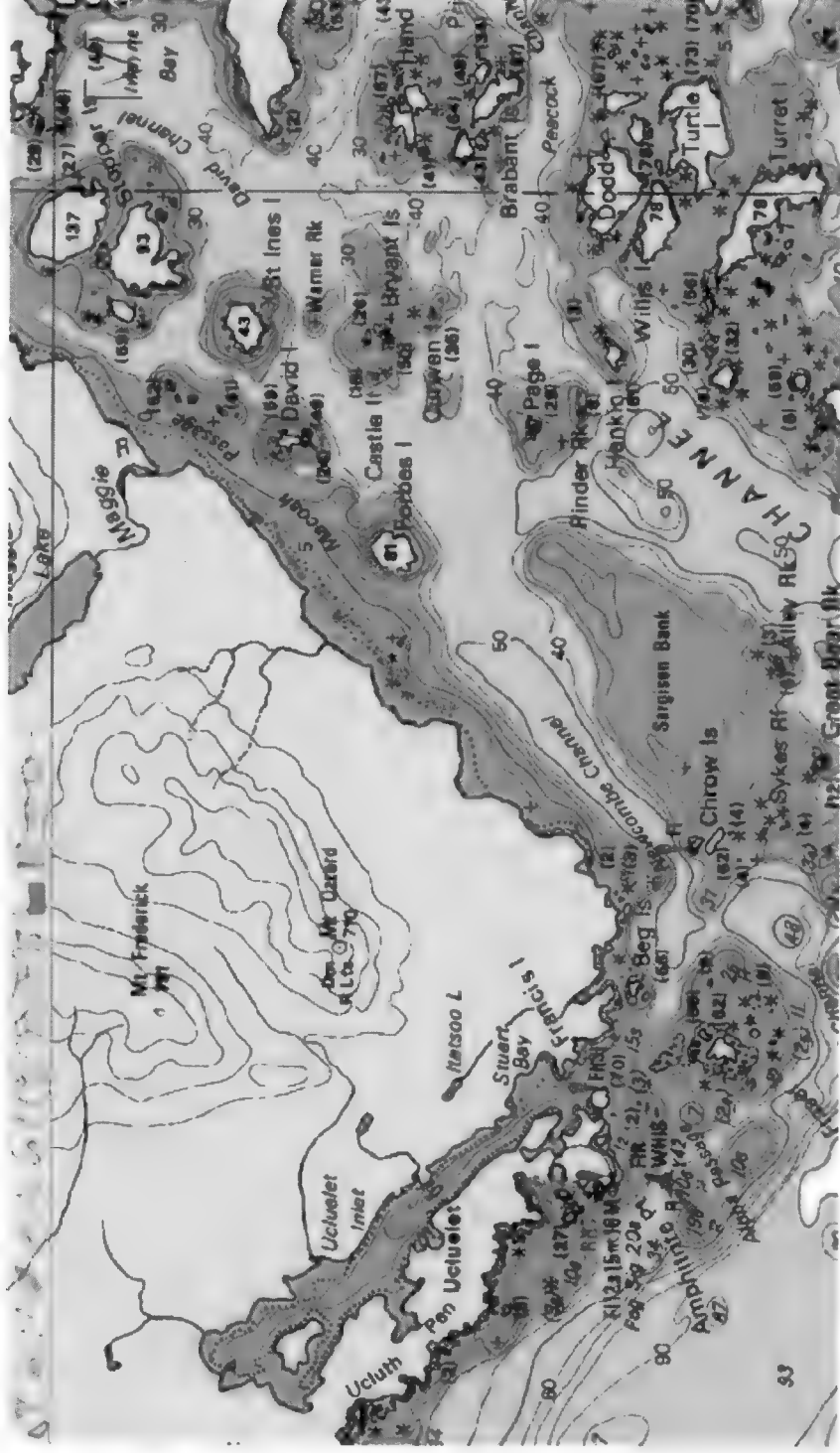
- Test vessel: Proud Canadian - 20 days
- Dive charters:
 - Vessel Based: Canadian Shore – 15 days
 - Shore Based: Seaveyor 1 – 20 days (combined with SOG)
- Spawn aircraft flights: 11
- First Nations reconnaissance surveys
 - Area 23 – 15 days
 - Area 24 – 30 days
 - Area 25 – 15 days



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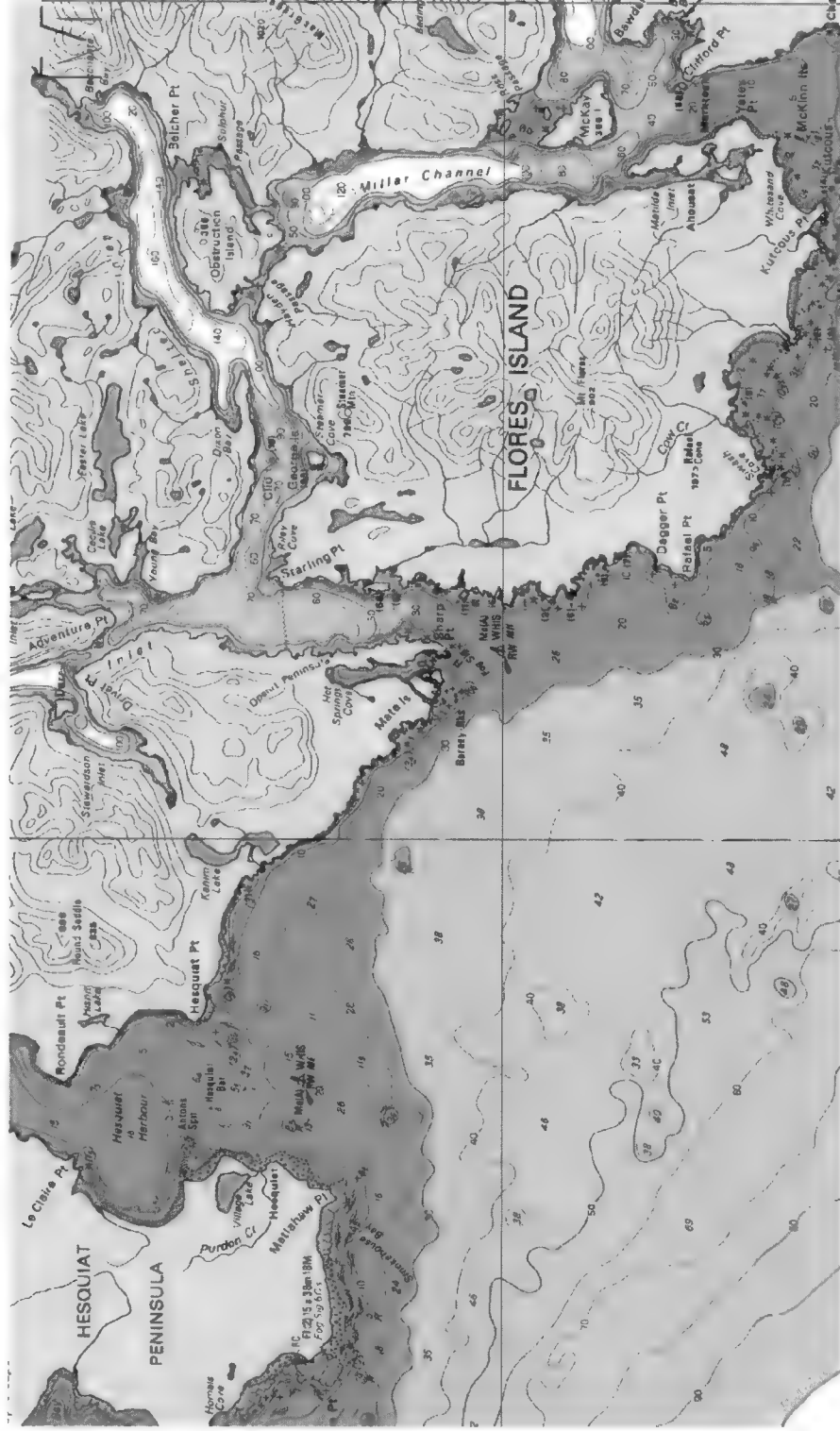
Area 23 – Barkley Sound



- Feb 13 – Mar 22
- 7.25 miles (aerial observations)
- Shore-based dive survey
- 5 samples - seine test
- 5 samples - experimental cast nets



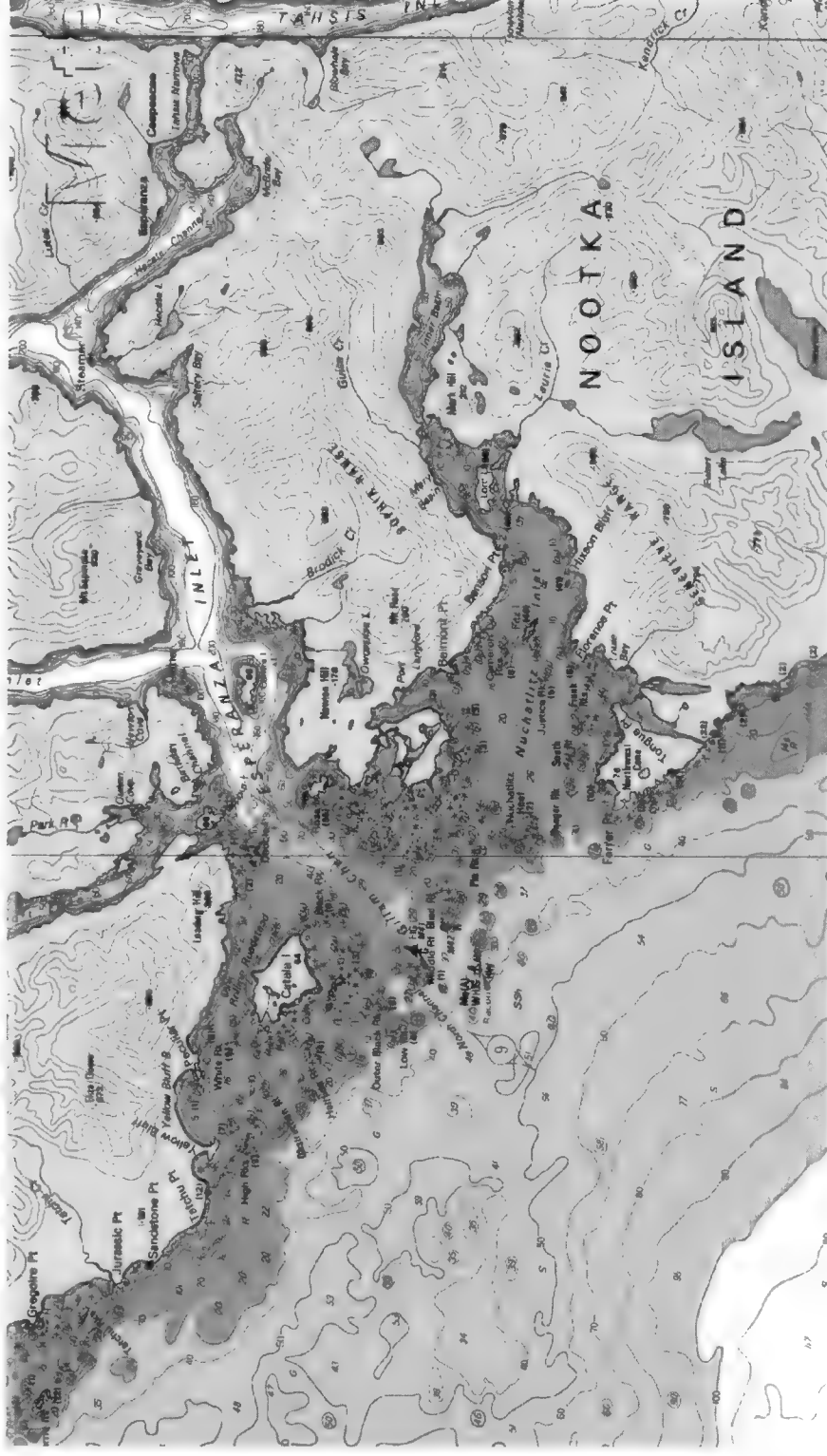
Area 24 – Clayoquot Sound



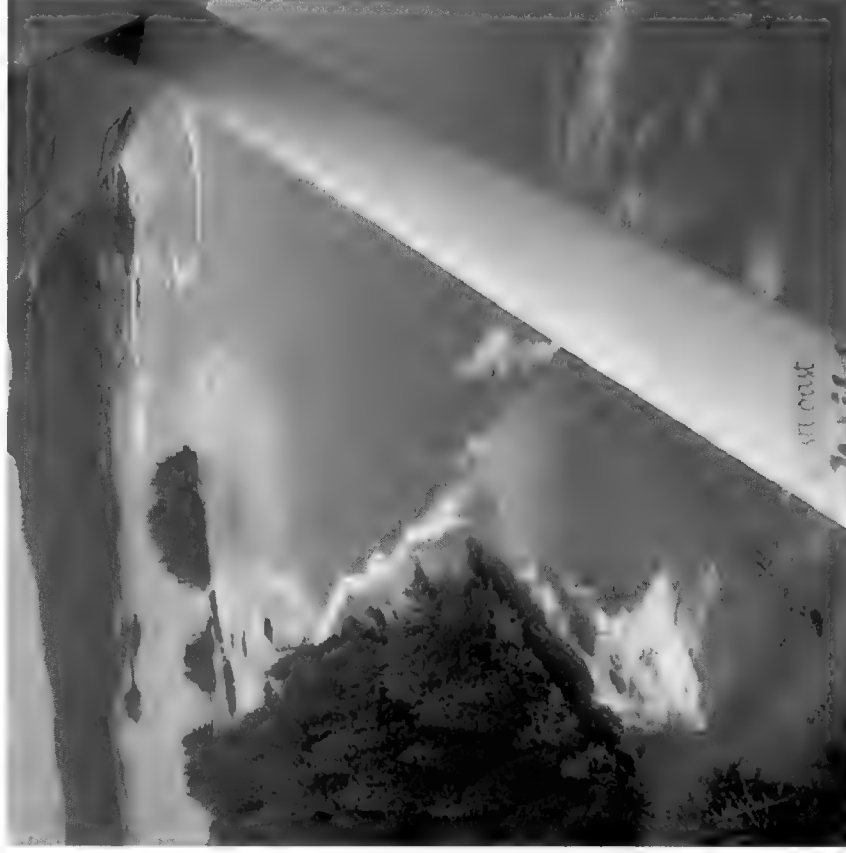
- Jan 30 – Mar 22
- 9.75 miles (aerial observations)
- Vessel & shore-based dive survey
- Surface survey
- 3 samples - seine test
- 2 samples - experimental cast nets



Area 25 – Esperanza Inlet



- Feb 23 – Mar 22
- 14.5 miles (aerial observations)
- Vessel & shore-based dive survey
- 3 Seine test samples (+1 Nootka)
- Note: no spawn observed in Nootka Sound, but test vessel caught spawned out fish



Area WCVI – Fisheries

- **FSC:** open
- **Commercial SOK:** closed
- **Commercial Roe:** closed

•Louie Bay – March 9 - Esperanza



Total Quota and Catch Calculations (in short tons)

ALL SEINES

- Total number of licences active: 227 of 252 licences
- Total seine quota: 14,228 tons
- Total seine catch: 10,819 tons
- Percent of total catch: 48.0% of coast-wide roe catch

ALL GILL NETS

- Total number of licences active: 1208 of 1267 licences
- Total gill net quota: 16,672 tons
- Total gill net catch: 11,707 tons
- Percent of total catch: 52.0% of coast-wide roe catch

ALL GEAR

- Total Quota: 30,900 tons
- Total Catch: 22,526 tons
- Percent of total quota caught: 72.9%

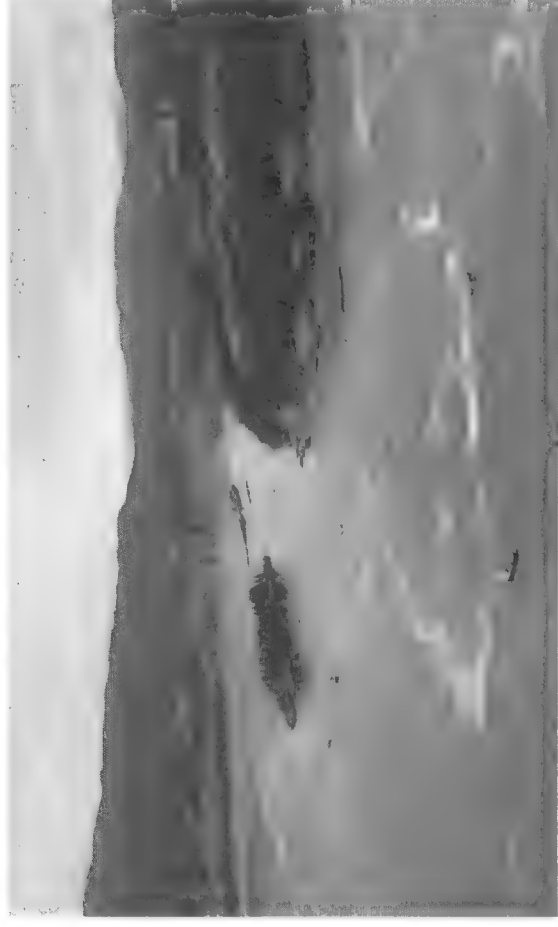


Fisheries and Oceans
Canada

Pêches et Océans
Canada

Discussions

- Feedback on roe herring season and management measures.
- Recommendations on approaches, consultation for post season, and for fall planning.
- Other recommendations or information needed for post season?



Canada



RECORD OF MEETING

Date: May 11, 2017

Location: DFO Regional Headquarters, Vancouver, BC

Purpose of Meeting: Post-Season review of 2016/17 Fisheries

Group/Advisory Committee: Integrated Herring Harvest Planning Committee (IHHPC)

Attendees:

Chair:

Corey Jackson, DFO (Chair)

Participants:

Greg Thomas, HIAB/HCRS
Donald McLeod, HCRS
Ted Assu, A-Tlegay Fisheries Society
Tony Roberts, Jr., NBBC/A-Tlegay
Reg Moody, Gladstone
Reconciliation Society
John Bolton, Heiltsuk Tribal Council
Carrie Humchitt, Gladstone
Reconciliation Society*
Tony Pitcher, UBC
Jeff Scott, UBC
Mimi Lam, UBC
Caroline Fox, Raincoast
Conservation Foundation
Penny White, NCSFNSS
William Beynon, Metlakatla

Participants cont'd:

Larry Greba, Kitasoo/Xaixais
Floyd Campbell, Ahousaht Fishing
Corporation
Mike Frost, HIAB

DFO Participants:

Mark Fetterly, DFO TAPD
Corey Martens, DFO FM
Peter Katinic, DFO FM
Brenda Spence, DFO FM*
Andrea Goruk, DFO FM*
Steven Groves, DFO FM
Jaclyn Cleary, DFO Science
Pierre Courville, DFO Ottawa
Les Sanderson, DFO C&P
Sarah Hawkshaw, DFO Science

Minute Taker:

Roger Kanno, DFO FM

* Denotes participation via teleconference

Meeting objectives:

- Post-season review of 2016/17 Pacific herring fisheries.
- Identify key management issues to inform early planning for 2017/18.
- Provide an update and seek advice on DFO Science initiatives.
- Provide an update and seek input on next steps related to Pacific Herring Renewal.
- Review and provide input on draft management objectives for Pacific herring.

Materials Distributed (list):

- Draft Agenda (via email)
- Revised draft IHHP C Terms Of Reference (via email)
- PowerPoint Presentations: (hard copies provided at meeting)
 - Overview of 2017 Aboriginal Herring Fisheries
 - 2016/2017 Roe Herring Plan Season Review
 - Food and Bait Herring Fishery 2016/2017 Season
 - 2017 SOK Fishing Review
 - Special Use Herring Fishery Update 2016/2017 Season
 - Pacific Herring Science Update
 - Pacific Herring Renewal: Update, Next Steps and Draft Management Objectives
 - The Selection and Role of Limit Reference Points for Pacific Herring in British Columbia, Canada (this presentation was not distributed as the CSAS paper had not yet been published)

Dropbox link to presentations:

<https://www.dropbox.com/s/8dzigsr265vvd0d/May%2011%2C%202017%20IHHP C PDFs.zip?dl=0>

Action Items:

- DFO to receive suggested revisions to the Record of Meeting from the October 6, 2016 IHHP C meeting by email (there were no suggested revisions received before or during the meeting, May 11, 2017).
- DFO to receive feedback on the draft TOR for the IHHP C by email and reschedule the item to discuss the governance structure of the IHHP C for the fall 2017 meeting.
- Distribute the CSAS LRP Science Advisory Report when it becomes available [and the associated PowerPoint presentation from this meeting].
- Follow up with Heiltsuk representatives prior to next season if action is required due to interactions between the SOK fishery and dive survey operations.
- Schedule a workshop with Metlakatla and Lax Kw'alaams to discuss objectives for Pacific herring and operational topics regarding herring fisheries in the PRD area.
- Continue discussions on objectives, including development of measurable objectives as outlined in the Pacific Herring Renewal Update presentation.
 - DFO to follow up with individual group(s) primarily on a bi-lateral basis to continue these discussions including moving onto the next step, simulation analysis to determine which management actions will meet these objectives.

1. Introductions, agenda and minutes from previous meeting

- Following introductions, the Chair reviewed the agenda and objectives for the meeting.
- The Chair provided an opportunity for comments/clarifications on the minutes from the October 6, 2016 IHHP C meeting. There were no immediate comments, but another opportunity for feedback could be provided at the end of the day, time permitting.

2. Presentation: Overview of 2017 Aboriginal Herring Fisheries

Roger Kanno, Fisheries Management (DFO) provided an update on the status of Aboriginal Herring Fisheries for 2017.

- Heiltsuk representatives did not have final landings information for FSC, but commented on a generally successful SOK fishery with increased landings over previous years in the FSC fishery and the achievement of quota by the commercial SOK fishery. Their view is that this is a result of the small commercial roe quotas (and no harvest at all for 2017) in the area for the past two years. Although the Heiltsuk fishery is improving, they stated that it is still challenging and requires significant effort.

3. Presentation: 2016/2017 Roe Herring Plan Season Review

Roger Kanno, Fisheries Management (DFO) gave a presentation that provided a review of the 2017 Roe Herring season. Changes from previous seasons included an inseason spawn criteria for opening roe fisheries in Areas 15 and 17S in SOG and all seine and gill net pool licences being issued with an equal share of available quota in the CC area.

- A HIAB representative expressed the view that there could be many reasons why the Heiltsuk SOK fishery was successful for the past two seasons and not just because of limited roe fisheries. He pointed out that there were many years when both the SOK and roe fisheries were successful in the Central Coast and that their view was there could be an opportunity for all fisheries in the Central Coast.
- There was discussion regarding concern over inseason soundings in the stock assessment areas identifying fewer fish compared to the preseason forecasts.
 - DFO response: The soundings are used inseason to identify the general location of concentrations of fish, but for post season stock status estimates and forecasting, the science advice is based on the dive survey information.
- There was general agreement that the effort in the science survey should be increased although it was recognized that the survey is already quite expensive and that the Department should continue to fund the survey in all areas.
- Several First Nations, including Metlakatla, Kitasoo, A-Tlegay and Heiltsuk expressed concerns regarding the low level of First Nations involvement in the stock assessment program as well as the lack of FSC opportunities in their areas.

4. Presentation: 2017 SOK Fishing Review

Steven Groves, Fisheries Management (DFO) gave a presentation summarizing the SOK fishing season for 2017. For areas that were open this year, most operators have achieved their quotas, although some are still operating in the PRD area.

- There was a question from a Heiltsuk representative whether the dive survey had any difficulties working around the open pond SOK lines in their area.
 - The manager was not aware of any issues, but would find out from survey staff and follow up with Heiltsuk representatives if required [it was later reported that there were lines in the vicinity of the survey so DFO will follow up with the Heiltsuk SOK committee prior to next season].

5. Presentation: Food and Bait Herring Fishery 2016/2017 Season

Roger Kanno, Fisheries Management (DFO) gave a presentation summarizing the 2016/2017 Food and Bait herring fishing season. Changes from the previous season included a catch cap of 2,000 short tons for Area 17S (south of Dodd Narrows).

- There was discussion regarding the uncertainty of stock structure and the recent (last 15 years) lack of spawning in Area 17S and the large amounts of spawn in the northern portions of SOG.
- Due to the uncertainty in the relationship between pre-spawning aggregations of fish and their eventual spawning locations, a full closure to the Food and Bait fishery was not implemented in Area 17S, but the catch cap was implemented to address concerns of lack of spawning in that area.

6. Presentation: Special Use Herring Fishery Update 2016/2017 Season

Roger Kanno, Fisheries Management (DFO) gave a presentation summarizing the 2016/2017 Special Use herring fishing season. Changes from the previous season included an additional unique quota in SOG of 100 tons for the A-Tlegay First Nation. Overall, catches were reported to be similar to past years with landings of 603 tons to date.

- There was a request from the Metlakatla representative regarding information on Special Use licences issued in their area. It was suggested that this and other operational fishery issues could be discussed at an upcoming bi-lateral meeting to be scheduled.

7. Presentation: Pacific Herring Science Update

Jaclyn Cleary, Science Branch (DFO) provided an overview of recent and upcoming herring science activities. She provided a summary of the 2017 survey activities and an overview of upcoming work for the 2017/2018 stock assessment and ongoing work to support Pacific Herring Renewal.

- The Marine Conservation Caucus representative asked why some science data requests had been denied in the past.
 - DFO response: Most data requests are routinely filled so suggest resubmitting any request for data that is still required. All data requests should be submitted to catchstats@dfo-mpo.gc.ca.

8. Presentation: The Selection and Role of Limit Reference Points for Pacific Herring in British Columbia, Canada

Jaclyn Cleary, Science Branch (DFO) gave a presentation summarizing the selection and role of LRPs for Pacific herring based on the CSAS regional peer review meeting held on February 7/8, 2017 and the upcoming Science Advisory Report. The presentation was not made available to participants at the time of the meeting as the SAR had not yet been approved [the approved SAR and the presentation were later made available to participants on May 19, 2017 via email].

- Production analysis showed that possible “serious harm” could be related to states of low productivity and low biomass (see presentation) for Pacific herring stocks.
- An LRP of 0.3 Bo is being recommended for all five major stock areas in the SAR.

- The NCSFNSS representative asked whether there would be work on target reference points.
 - DFO response: This will be covered later in the meeting as part of Renewal, but it is anticipated that targets will be part of upcoming bi-lateral objective setting discussions.
 - Herring Renewal will also involve determining how LRPs will be incorporated in changes to the management approach for Pacific herring (e.g. probability of avoiding LRP over what timeframe).
- The CSAS LRP Science Advisory Report is now available: http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2017/2017_030-eng.html

9. Presentation: Pacific Herring Renewal Update

Corey Jackson, Fisheries Management (DFO) gave an overview of work to date and next steps in Pacific Herring Renewal. Considerations when developing management objectives as well as examples of potential measurable objectives were provided (see presentation).

- USR (Upper Stock References) will need to be discussed as there is no prescriptive way of defining them so will be informed by Fisheries Management consulting with fishery participants with advice and input from Science.
- There was some discussion regarding objectives and assessing how particular management approaches could be simulated to determine if objectives would be met.
 - It was pointed out that this would be dependent on assumptions such as productivity used in the simulations. Zero fishing scenarios would also be included to help in understanding the effect of harvest.
 - Seeing the results of simulations will likely help participants in understanding the effect of different management approaches including comparisons to the current management approach.
 - Establishing a USR will be an iterative process as we learn from the results of simulations and new information is received [e.g. mortality].

10. Discussion: Values of Participants in Herring Fisheries

Dr. Mimi Lam, gave an overview of three herring research projects currently underway through the University of British Columbia, at the Institute for the Oceans and Fisheries.

- Ecosystem modelling project for Haida Gwaii herring: NSERC partnership with the Haida Nation and the Heiltsuk Tribal Council.
- Haida Gwaii herring values research: HG community interviews with Haida elders, artists, scientists, fishers, and Haida and non-Haida residents. Research funded through the Peter Wall Institute for Advance Studies.
- Perspectives on management of herring in HG: interviews with herring fishers and processors to identify values; research funded through the T. Buck Suzuki Foundation and Mitacs.

11. Adjournment

- As time for the meeting was drawing to a close, the chair suggested that the discussion regarding the IHHPG Governance and Structure could be continued at the fall IHHPG meeting and any comments on the draft TOR that was previously circulated could be emailed to him.
- Also due to time constraints, any suggested revisions to the minutes from the previous meeting would also be accepted by email.

Meeting adjourned at approximately 4:00pm.



RECORD OF MEETING

Date: November 9, 2017

Location: Rm 420, SFU Wosk Centre for Dialogue, 580 West Hasting Street,
Vancouver BC

Purpose of Meeting: Pacific herring stock and management update, and planning for 2017/18

Group/Advisory Committee: Integrated Herring Harvest Planning Committee (IHHP)

Attendees: **Chair:**
Brenda Spence, DFO (Chair)

Participants:

Reg Moody, Heiltsuk/Gladstone
Reconciliation Society
Greg Thomas, HAB
Chris Cue, HIAB
Nicole Frederickson, IMAWG
Marion Campbell, Ahousaht
Rufus Charleson, Hesquiaht
Floyd Campbell, Ahousaht
Karl Rekdal, J.O. Thomas and Assoc.
Jared Dick, NTC
William Beynon, Metkatla
Penny White, NCSFNSS
Tony Roberts, Jr., Native
Brotherhood/A-Tlegay
Larry Greba, Kitasoo/Xaixais
Phone:
Allison Witter, Province of BC
Brian Assu, A-Tlegay Fisheries
Society

DFO Participants:

Roger Kanno, FM
Christine Bukta, FM
Steven Groves, FM
Jaclyn Cleary, Science
Mark Fetterly
Peter Hall, FM
Les Sanderson, C&P
Bill van Egteren, C&P
Corey Martens, FM
Jonathon Thar, FM
Kristen Wong, FM
Leigh Edgar, FM RHQ
Liane O'Grady

Meeting objectives:

- Review of current timelines and milestones.
- DFO Update on Pacific Herring Renewal (Science and Fisheries Management).
- Review the preliminary results of the annual stock assessment and forecast for 2017/18. Stock assessment planning 2018 season.
- Development of the IFMP and fishing plans for: Aboriginal Fisheries, Food & Bait, Special Use, Spawn-on-Kelp, and Roe Herring.

- Discuss specific considerations: by Herring Stock Assessment Area: HG, PRD, CC, SOG, WCVI.
- Seek advice and recommendations on the management approach (fishing areas and harvest levels) for 2017/18.
- Discuss IHHPC process and governance.

Materials Distributed via email (list):

- Draft Agenda
- IHHPC Draft Terms of Reference (for discussion)
- Draft September 14, 2017 IHHPC Record of Meeting
- Draft 2017/2018 Pacific Herring Science Advisory Report
- Pacific Herring Renewal: Update and Next Steps on Renewal of the Management Framework
- Stock Assessment for Pacific Herring (*Clupea pallasii*) in British Columbia in 2017 and forecast for 2018
- Overview and Development of Fishing Plans for 2017/18.

Summary of Action Items:

- DFO Science to follow up with Ahouah and A'telgay survey contracts.
- Kitasoo to distribute plan to the IHHPC list. Staff and DFO Science to follow up re: alternate sampling gear.
- Proposed date for spring meeting week of May 7 and 11.
- DFO to report on how many of the 252 seine and 1,267 gillnet licences active for 2018 (HIAB request) or in DFO inventory.
- DFO proposed working on Terms of Reference document via email over coming months.
- DFO to provide availability for follow-up meetings with First Nations in the next few weeks.
- Commercial fishery risk assessments to be undertaken

Welcome, Introductions, Review of Agenda

Following introduction, DFO reviewed the draft agenda and meeting objectives, outlined as follows:

- Review of current timelines and milestones.
- DFO Update on Pacific Herring Renewal (Science and Fisheries Management).
- Review the preliminary results of the annual stock assessment and forecast for 2017/18. Stock assessment planning 2018 season.
- Development of the IFMP and fishing plans for: Aboriginal Fisheries, Food & Bait, Special Use, Spawn-on-Kelp, and Roe Herring.
- Discuss specific considerations: by Herring Stock Assessment Area: HG, PRD, CC, SOG, WCVI.
- Seek advice and recommendations on the management approach (fishing areas and harvest levels) for 2017/18.
- Discuss IHHPC process and governance.

Discussion

- First Nations: It's important to start discussing a new IHHPC process and governance that is consistent with the Prime Minister's commitments to establishing a new relationship with First Nations. DFO needs to start coming to local and regional tables to start these planning discussions. Want to work with DFO and industry.

The old approaches reflected in this agenda have to change. We don't want to have to go to court every time we disagree with your plan.

DFO: The focus of this meeting is to hear and discuss considerations by fishery and for each area.

- First Nations: The management process is flawed, not just the structure of this meeting. We want a co-management role, e.g. in setting commercial quotas for fisheries in traditional territory.

Pacific Herring Renewal: Update & Next Steps

Brenda Spence, Jaclyn Cleary, DFO

DFO's presentation provided an update & overview of next steps on renewal of the Pacific herring management framework (*See Powerpoint for details*).

Discussion: Element 1

- First Nations: Our understanding of concepts like PA (precautionary approach) and conservation may differ from that of DFO or others. DFO requires prior informed consent for managing fisheries in our territory. How will you address these issues to avoid further court action? Discussion needs to start on how to incorporate our science into yours.
- NCSFNSS: We appreciate the challenge of DFO doing finer-scale evaluation at this point, but does the US have tools that we can adapt for that, e.g. to implement some management by spawning area?

DFO: Some US management areas have smaller stocks, with unique features like size at age and spawn timing that are quite distinct. Stock structure is a very difficult science question.

- NCSFNSS: When we can break up these bigger stocks, will reference points be recalculated for smaller populations.

DFO: Important question but not clear.

- NCSFNSS: We've provided some North Coast samples, initial results appeared to be promising. DFO should consider prioritizing that work.
- Kitasoo: Can the approach developed for WCVI be modified for areas? It would also be helpful for us to hear WCVI First Nations feedback. DFO should place strong emphasis on the spatial work, which is very important to First Nations.

DFO: The operating models are specific to the data for each area and target objectives will emerge from the discussions for specific areas. The common thread is 'simulation testing of the same harvest control model for different areas. Some stocks may support higher harvest levels than others.

- Kitasoo: In the Central Coast example, if most of the CC stock biomass is concentrated in Kitasoo Bay, you could be forcing excessive commercial harvest into other areas.
- Ahousaht: DFO has heard our concerns and we appreciate work to capture those.

Presentation, continued: Element 2 - Review of license fees, pooling and licensing system, potential alternatives to on-grounds management.

- Q/A: JO Thomas will be the contractor for the roe herring at-sea observer pilot.
- A'tlegay: This may be an opportunity for A'tlegay to provide coverage.

DFO: First Nations participation would be a good element to the program if feasible.

Presentation, continued: Element 3 - Updated stock assessment and survey plan.

Discussion

- First Nations would like contracts where they have capacity in their territories, and concerns about reduction of stock assessment.

DFO: DFO has identified interim relief funding and many other fisheries developed cost-sharing arrangements for such work. The intent is to identify core assessment requirements and the risks of not doing them.

Review: Draft Minutes of previous meeting

DFO invited participants to review and submit comments on the draft meeting record of the September 14 conference call.

Preliminary stock assessment & 2017/18 forecast

Jaclyn Cleary, DFO

DFO presentation covered the following key points (*See Powerpoint for details*):

- Stock assessment inputs: 1951 - 2017 time series on catch, biological data and spawn index, including catch by gear type, proportion at age, weight at age, spawn index.
- Q/A: Decline noted in the spawn index is for the whole Central Coast [information is not provided at a finer scale].

Technical program overview

- 2017/2018 process/activities
- Results by area, including abundance, natural mortality, age-2 recruits, spawning biomass, annual production trends and identification of historical periods of serious harm (negative production).
- Results for Haida Gwaii (HG):

Discussion

- Kitasoo: Does DFO see correlation of stock declines with environmental conditions?

DFO: The stock assessment model doesn't address such questions. For this area, there appears to be closer correlation with marine mammal populations (as opposed to ocean temperatures).

- Probabilistic decision table: Includes new column on probability of stock falling below the LRP (Lower Reference Point) under different harvest scenarios.
- Results for Central Coast, West Coast Vancouver Island (WCVI)
- Ahousaht: At what limit is fishing closed?

DFO: The LRP does not determine that decision. The risks of going below the LRP can vary based on the characteristics of different populations.

- Results for Strait of Georgia (SOG), Prince Rupert (PR): No evidence of serious harm observed for SOG or PR. Science advice recommends applying limits based on proxy analysis of other areas.

Discussion

- First Nations: Concerns about the growing predation by sea lions in SOG and reduction of the test fishery and sounding program.

DFO: For SOG we have a test fishery for at least 30 days, plus sampling. There has been no reduction in surveys.

- NCSFNSS: It's interesting that the commercial cut-off is below the LRP in PRD so I expect more discussion of that.

DFO: No simulations to inform using a LRP as a fishing cut-off point determining how to apply information on LRP in the absence of simulation. The data show that stock biomass and combined catch have been stable in recent years.

- NTC: Does stock assessment take into account changes in natural mortality based on abundance of key predators such as large marine mammals?

DFO: Year-to-year changes in natural mortality are factored into the model and are based on analyzing changes in age structure to estimate changes in predation pressures. Pacific Fisheries Monitoring Framework

Jonathan Thar, DFO

DFO presentation covered background & current policy context, overview of the regional strategic framework, implementation update and next steps (*See Powerpoint for details*).

Discussion

DFO distributed copies of the Monitoring & Compliance Panel's information documents on risk assessments.

- HIAB: Why was the herring fishery prioritized for risk assessment and implementation?

DFO: All fisheries will be assessed over time.

- IMAWG: There needs to be adequate consultation with First Nations harvesters about the FSC fishery risk assessments.

DFO: It would be useful to discuss how to efficiently group topics for consultation with First Nations to avoid overload.

- NCSFNSS: It's also very important that we get the information far enough in advance to allow time to review and develop feedback.
- IMAWG: When this concept was initially presented, DFO discussed having these risk assessments done jointly with First Nations. It will be very challenging for us to cover consultations on all these issues given the very tight timelines.

HIAB/IHHPC 2017/2018 Season Planning

Brenda Spence, Steven Groves, DFO

DFO presentation reviewed context and key decisions required for the 2017/2018 Pacific herring season (*See Powerpoint for details*), including:

- Comparison of results from applying the two herring models (AM1 and AM2) for 2017/2018 planning:

- Q/A: There is no decision yet on whether to use AM1 or AM2 or whether to use different models for different regions, although the latter is unlikely.

Limit Reference Points, implementation, example of a decision table with new LRPs.

Discussion

- Q/A: High probability is defined in the PA policy as 75% - 95% and very high probability is defined as 95% and up.
- Key decisions and information for the 2017/2018 transition period; phased approach proposed to implementing LRPs, along with a management strategy evaluation and identification of measurable objectives.
- Coast-wide LRP implications; coast-wide metrics by area.
- Haida Gwaii: Current population status is below cutoff and LRP. Overview of fisheries, assessment, management. No commercial fisheries expected in 2018, no 2017 spawn survey in 2W.
- Prince Rupert: DFO is seeking advice.

Discussion

- Metlakatla: Propose that DFO meet with Metlakatla and perhaps other PRD First Nations to discuss this.
DFO: Planning timelines are tight and DFO would appreciate early discussions. .
- NCSFNSS: Suggest that DFO revise and broaden the meaning of the term “serious harm” — e.g. to encompass First Nations no longer being able to conduct traditional fisheries.

Presentation, continued: Overview of fisheries, assessment and resources for Prince Rupert, along with key questions for 2017/2018 fishery planning.

- NCSFNSS: DFO should expect more comments from us in the bilateral sessions.

Presentation, continued: Central Coast: Positive production trend, CC planning discussions already underway. Overview of fisheries, assessment, management resources and key questions.

Discussion

- Q/A: The 600t figure for CC FSC is taken from the IFMP and those figures are based on total expected mortality. DFO welcomes discussion on current communal licence allocations.
- Metlakatla: Is there room for First Nations observers on board? We have interest in staff training/capacity building.

DFO: Observers are welcome to come out for a day, but living quarters are limited.

- HIAB: Has DFO considered having a second seine boat that alternates between WCVI and NC every other year if funding is limited and more coverage is desired for these large areas?
- Ahousaht: NTC has been requesting to be part of the assessment surveys.

ACTION: Jaclyn to follow up with Marion and Tony re: potential survey contracts.

- Kitasoo: We plan discussion with neighbouring First Nations on expanding our local area management plan. We will be requesting bilateral meetings (or maybe CC-wide) as we need to discuss this in more detail with DFO staff. We're also wondering about DFO being open to changing sampling gear based on the method we tested last year.

ACTION: Kitasoo to distribute plan to the IHHP list. Staff and Jaclyn to follow up re alternate sampling gear.

Presentation, continued: SOG - Overview of production analysis, key fisheries and fishery issues, assessment, resources and key management questions.

Presentation, continued: WCVI - Overview of production analysis, key fisheries, assessment, resources and key questions.

Discussion

- Hesquiaht: What's the survival rate for kelp on eelgrass?
DFO: Survival rate is good when it's below the tideline, depends on conditions.
- Q/A: Even though the survey index is up, the stock is not in a period of growth. It's just fluctuating around a low biomass.
- Q/A: There is no decision on having commercial fisheries. We are providing science information now and looking for feedback before those decisions are made.

Planning timeline and next steps.

DFO is looking for feedback, based on the science advice shared here, before making recommendations to the Minister in late November. There would then be consultation on the draft plan, to be finalized by late January.

Next meeting date

ACTION: Proposed date for spring meeting between May 7 - 11.

Overview & Development of 2017/2018 Fishing Plans

Brenda Spence, DFO

DFO presentation covered planning for the following fisheries (*See Powerpoint for details*):

- Aboriginal fishing plan - no changes this year
- Food & Bait

Discussion

- NCSFNSS: NC reps want more collaboration on determining fishing area if there is a quota for Food & Bait. There are some concerns about the spatial analysis that we have not yet discussed.

DFO: We have received written comments from Metlakatla and will respond.

Presentation, continued:

- Special Use
- Roe Herring

- HIAB: It would be useful to know exactly how many seine and gill licenses are active or held in DOF inventory.

ACTION: DFO to report on how many of the 252 seine and 1,267 gillnet licenses are active for 2017/2018 (and how many will remain in inventory).

Other business

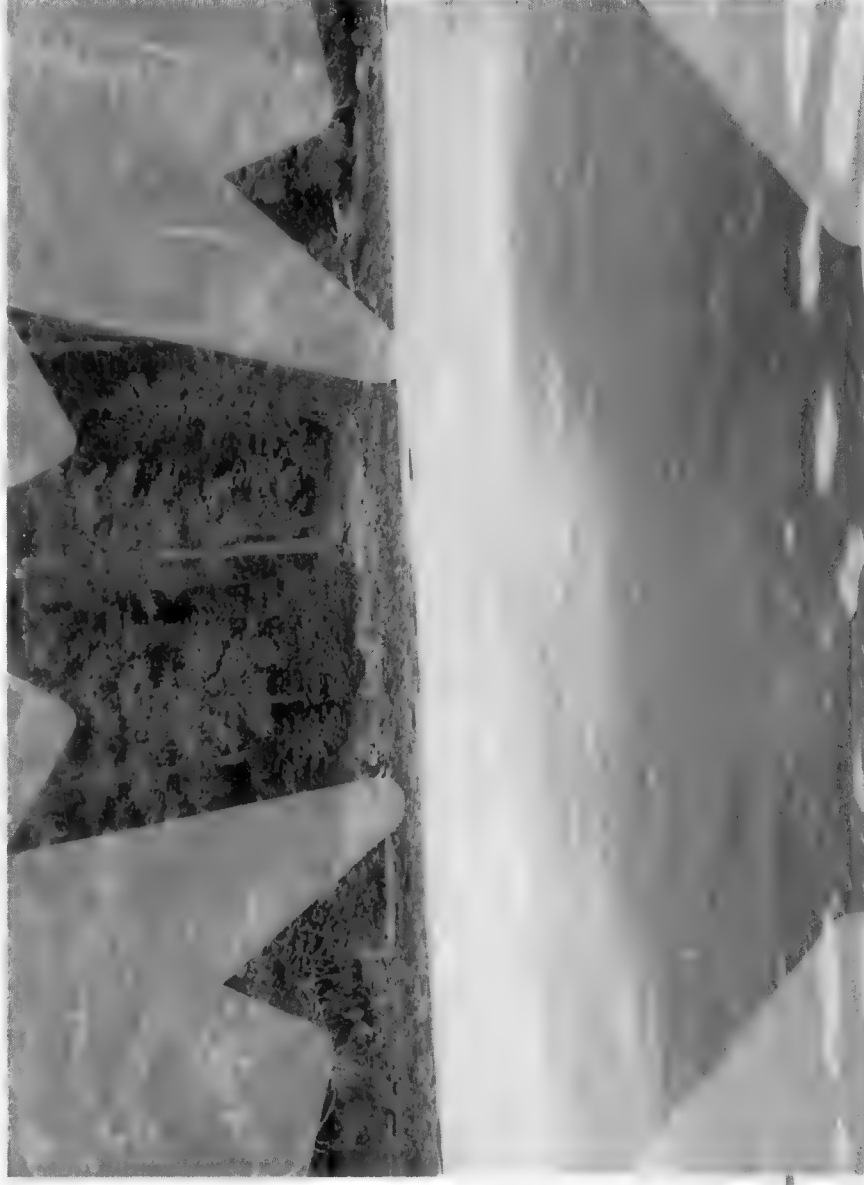
Terms of Reference document: DFO proposed working on that by email if requested, but would like to keep this as an active agenda item for future consideration.

DFO invited other topics for discussion:

ACTION: Brenda to email availability for PRD and other follow-up meetings in the next few weeks.

- No other business or comments.

Adjourned: 3 PM



Integrated Herring Harvest Planning Committee Pre-Season Meeting October 17, 2018

Canada

IHHPC Meeting Objectives

1. Update on DFO initiatives
2. Review of 2018/19 planning timeline
3. Update on Pacific Herring Renewal and Management Strategy Evaluation
4. Review the preliminary results of the 2018/19 stock assessment and forecast and plan for 2019 stock assessment
5. Discuss development of the IFMP by stock assessment area
6. Discuss IHHPC Terms of Reference

Agenda

TIME	TOPIC
9:00 – 9:15AM	Review of agenda and meeting objectives
9:15 – 9:45AM	Review and update of IHHP action items Review of 2018/19 planning timeline
9:45 – 10:30AM	Update on current DFO initiatives
10:30 – 10:45AM	BREAK
10:45 – 11:15AM	Update on Pacific Herring Renewal and Management Strategy Evaluation
11:15 – 11:45AM	Overview of Science Response (stock assessment and forecast) results and planning for 2019 stock assessment
11:45AM - 12:45PM	LUNCH (on your own)
12:45 – 1:15PM	Development of the IFMP and commercial fishing plans Discussion of specific considerations by stock assessment area
1:15 – 2:00PM	Seek advice and recommendations on the management approach (fishing areas and harvest levels) for 2018/19
2:00 - 2:15PM	BREAK
2:15 – 2:45PM	SOK Transferability
2:45 - 3:30PM	IHHP Terms of Reference
3:30 – 4:00PM	Review action items, set next call and meeting dates
4:00PM	Meeting adjourned

Review and Update of IHHPC Action Items

1. ***Question regarding Science involvement in the Offshore AOI process, and seamounts affecting commercial fisheries/herring migration patterns. RM to follow up with Science, and then report back to IHHPC.*** Update: No progress on this piece, work ongoing with Offshore AOI and will work on gathering information.
2. ***DFO to provide trend of spawning dates by area at next IHHPC meeting if possible.***
3. ***DFO Science to follow up with A-Tlegay Fisheries Society and Ahousaht Fishing Corporation about funding and developing capacity for dive surveys in their area, such as ensuring correct dive certifications.*** Update: unable to provide funds asked for late last Spring
4. ***DFO to gather information/implications of marine mammal impacts and mitigation measures from Science and report back to IHHPC, and provide the Science marine mammal contact.*** Update: no specific marine mammal contact that can speak to herring interactions, S. Majewski and S. Tucker are pinniped experts. 2018 CSAS document available on Sea lion population assessment. Mitigation measures not being considered at this time.

Review and Update of IHHPC Action Items

5. ***DFO to report back to the IHHPC about health agency capacity for cholera testing of brined eggs and mitigation measures, and to send literature review around if one becomes available, and look into measures such as making risks known and taking safe handling measures.*** Update: Risk assessment currently underway (Health Canada) on risks and mitigation measures, briefing end of October. DFO will share information as it becomes available and follow advice of Island Health of fishery openings/closures.
6. ***DFO to provide Vancouver Island Health Authority contact to TBuck Suzuki Foundation (re: Norovirus)*** Update: complete
7. ***DFO RM to send summary of the history of Pacific Herring Renewal initiative to UFAWU and NBBC to clarify governmental objectives.*** Update: Work not undertaken, is this still required?

Draft 2018/19 Timeline – subject to adjustment as required

Oct 16	IMAT Herring Technical Meeting
Oct 22	Q'ul-Ihanumtsun Aquatic Resources Society (SOG First Nations group) meeting
Oct 25	Consultation Period for Food & Bait/Special Use plans ends
Oct 30	IMAWG Tier II meeting
Oct 24	Food & Bait licence application
Nov 2	MSE Operational Objectives Meeting – NCN (WCVI)
Nov 5	Food & Bait and Special Use Commercial Fishing Plans approved, licence issuance
Nov 7	Food & Bait and Special Use fisheries open
Nov 8	Tla'amin Nation meeting
Nov 14	Ministerial decision on 2018/19 management approach
Nov 20	IHPC Conference call
Nov 22	DRAFT 2018/19 IFMP available and released for 30-day consultation period
Nov	Maa-Nulth Nation 2018/19 IFMP and planning meeting – date TBD
Dec	In season adjustment to F&B quota for SOG, if required
Dec	QARS - South of Dodd Narrows MSE Workshop (SOG) – date TBD
Dec 21	DRAFT IFMP consultation period ends
Early Jan	Roe licensing process and Roe selection into Food & Bait commences
Jan 22	Pacific Herring 2018/19 IFMP approved
Feb 11	Roe license issuance completed

Update on Current DFO Initiatives

- Reconciliation (2)
- Ahousaht Decision (1)
- Species at Risk (SARA)(1)
- Marine Conservation Targets, Marine Planning Initiatives, Rockfish Conservation Areas (12)
- Marine Mammal Regulations and Reporting (3)
- Southern Resident Killer Whale (5)
- Shark reporting(5)
- Vibrio cholera(1)
- Norovirus(2)
- Fishery Risk Assessments (5)
- Safety at Sea(1)
- Fisheries Act Amendments (-)
- HG Rebuilding Plan(2)

Reconciliation with Indigenous Peoples

- The Government of Canada is committed to achieving reconciliation through renewed, Nation-to-Nation, Government-to-Government, and Inuit-Crown relationships based on recognition of rights, respect, co-operation, and partnership as the foundation for transformative change
- *Principles respecting the Government of Canada's Relationship with Indigenous Peoples* affirm recognition of Indigenous Peoples and their rights as the necessary starting point for the Crown to engage Indigenous Peoples and as the foundation for transforming laws, policies, and operational practices.
- National engagement on a new Recognition and Implementation of Indigenous Rights Framework in parallel with the agenda of the Working Group of Ministers.
- 22 British Columbia First Nations communities are currently engaged at a Reconciliation of Indigenous Rights and Self-Determination table with Canada

Reconciliation with Indigenous Peoples

- Government of Canada reconciliation objectives are widely articulated and given effect through:



- **CIRNA** (Crown-Indigenous Relations and Northern Affairs) leads process (Recognition of Indigenous Rights & Self-Determination or RIRSD) on behalf of Canada. Engages other Governments (such as DFO) when required
- CIRNA : <http://www.aadnc-aandc.gc.ca/eng/1523210699288/1523210782692#sec31>

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Ahousaht Reconciliation Negotiations

- Negotiations towards a reconciliation agreement between Ahousaht and Canada are ongoing while DFO takes measures to implement components of the Ahousaht Decision where clear direction was provided by the Supreme Court.
- DFO has provided additional access to Ahousaht and is engaged in negotiations to implement additional demonstration fisheries for crab, sea cucumber and groundfish. Cross-sectorals are expected to occur in Winter 2018.
- DFO has worked with the Ahousaht to draft a term sheet that reflects the Nation's interests.

Species at Risk (SARA): Update

- Processes to consider listing under the SARA
 - Eulachon (3 populations) – consultations concluded in 2016
 - Bocaccio – consultations concluded in 2017
 - Spiny Dogfish – consultations concluded in 2013
 - Salmon species (upcoming: Sakinaw Sockeye, Interior Fraser Coho, Fraser Sockeye – multiple pops, southern Chinook – multiple pops)
 - Grey Whale (3 populations)
 - **Steelhead Trout (Thompson and Chilcotin DUs) – consultations close Dec 2**
- SARA Recovery documents with national consultations
 - Amendments for new critical habitat: **Resident Killer Whale (consultations close Nov 3)**, Transient Killer Whale, Large Whales
 - Offshore Killer Whale (KW) Recovery Strategy (proposed pending)
 - Transient KW – Action Plan and amended Recovery Strategy (p. pending)
 - Basking Shark Action Plan (proposed pending)
 - Leatherback Action Plan (proposed posted)
 - Yelloweye Management Plan (proposed pending)
- SARA.XPAC@dfo-mpo.gc.ca
- <http://www.dfo-mpo.gc.ca/species-especes/sara-lep/index-eng.html>

Marine Conservation Targets

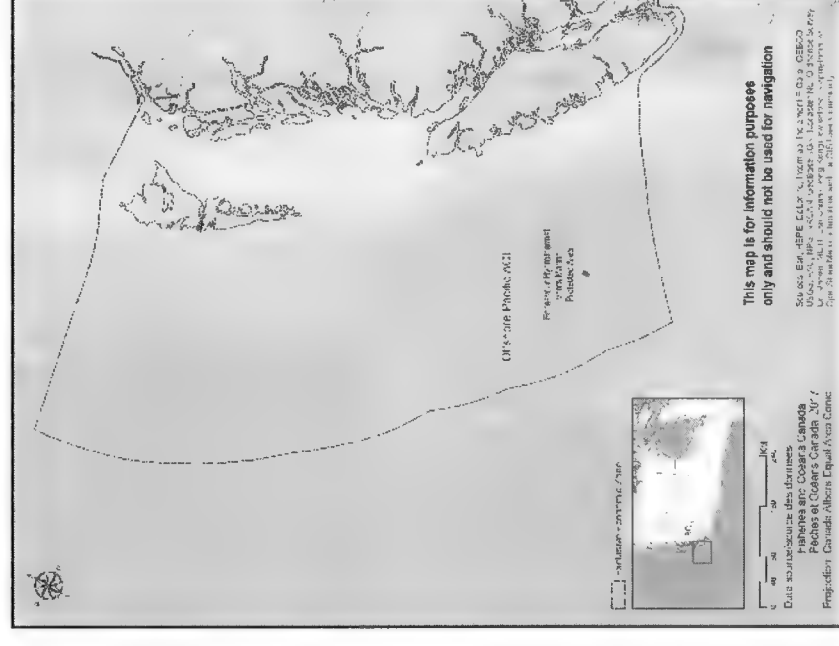
- **MPA:** An area that is legally protected and managed to achieve conservation goals. Current and future human use activities are regulated to ensure the ecological features of interests are protected. Established under the Oceans Act through a regulatory process supported by science, policy, socioeconomic information, and broad consultative processes.
- Canada's target of ocean protection is 10% by 2020
 - Surpassed interim target of 5% by 2017 (now at 7.7%)
- Lead: Kelly Binning, Oceans
 - More information: <http://www.pac.dfo-mpo.gc.ca/consultation/oceans/index-eng.html>

Marine Planning Initiatives

- Offshore Pacific Area of Interest
- Hecate Strait & Queen Charlotte Sound Glass Sponge Reefs
- Northern Shelf Network Planning in the Northern Shelf Bioregion
- Howe Sound Glass Sponge Reef Conservation Initiative
- Rockfish Conservation Area Review
- Scott Islands Marine National Wildlife Area
- Gwaii Haanas National Marine Conservation Area
- Southern Strait of Georgia National Marine Conservation Area

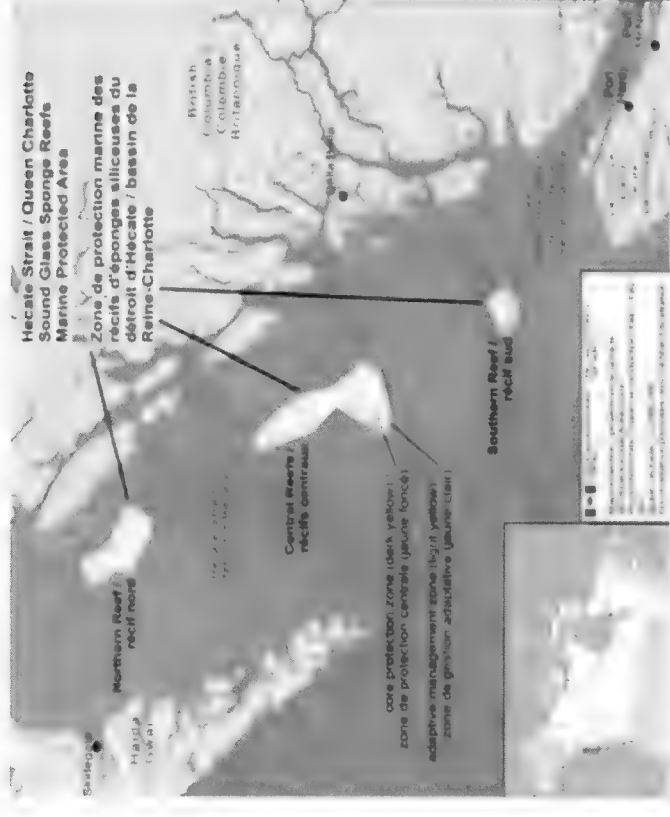
Offshore Pacific Area of Interest

- Offshore Pacific Advisory Committee (OPAC) established to provide a forum for broad engagement for review and development of the proposed MPA
- Bilateral engagement with WCVI and Haida Gwaii Indigenous governments ongoing
- DFO contact: Joy Hillier (Oceans)



Hecate Strait & Queen Charlotte Sound Glass Sponge Reefs

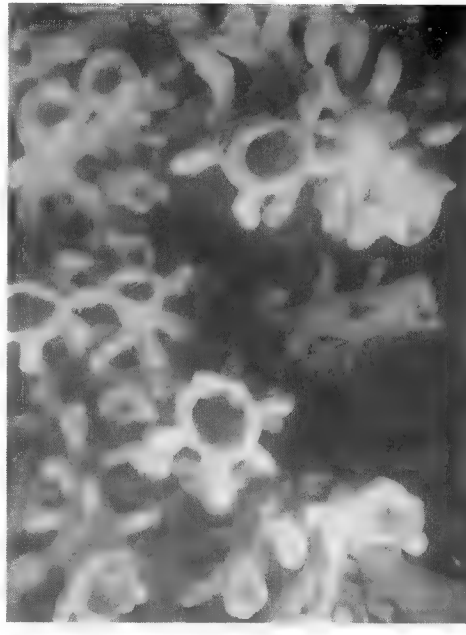
- Hecate MPA Advisory Committee (HAC) to support development of a management plan, no date yet for first meeting
- Progress made to establish co-management arrangements with Indigenous governments in the area
- Draft workplan indicating stakeholder engagement timeline will be developed this fall
- DFO contact: Jacinthe Amyot (Oceans)



Northern Shelf Network Planning in the NSB

- Areas of high ecological and cultural value have emerged from the spatial analysis conducted by the MPAT
- 5 in-person stakeholder advisory committee meetings held in May and June
 - Based on input from advisory committees, working to develop a draft Network scenario (map) that will be shared with advisory committees later this fall
- Anticipated completion date of Network design scenario(s) by November, engagement with advisory committees in early December
 - Stakeholders will be given time over the winter months to review and comment on the scenario in detail
- DFO contact: Sheila Creighton (Oceans)

Howe Sound Glass Sponge Reef Conservation Initiative



- 9 new glass sponge reefs found in Howe Sound
- Multi-stakeholder workshop held in July 2018 to consult on proposed mitigation measures
- Feedback was generally supportive but debate over size of buffer zone
- DFO team reviewing feedback and preparing recommendations on proposed mitigation measures for the Minister/RDG this fall
- DFO contact: Aleria Ladwig (FM, SFF)

Rockfish Conservation Area Review

A multi-year review of the conservation effectiveness of RCAs is currently underway.

Areas of focus:

1. **Assess activities and risks in RCAs:** Assess current activities and their risks to rockfish and their habitat. Consider other measures to improve the conservation effectiveness of RCAs.
2. **Re-evaluate RCA boundaries and locations:** Evaluate the conservation benefit of RCAs by considering various ecological attributes.
3. **Engagement** with coastal First Nations, commercial and recreational harvesters, other interest groups.

RCA Review: Engagement Timeline

Northern Shelf Bioregion

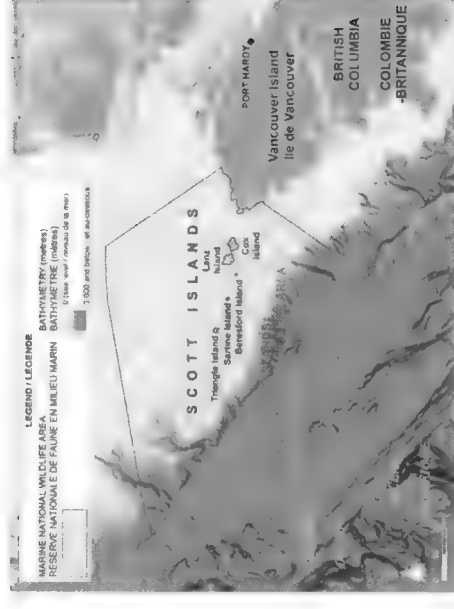
- First Nations engagement beginning Summer 2018
- Consideration of RCAs in NSB MPA Network designs beginning Summer 2018
- Stakeholder engagement beginning Fall 2018
- Development of RCA improvement options by Winter 2018/19

Strait of Georgia and Southern Shelf Bioregions

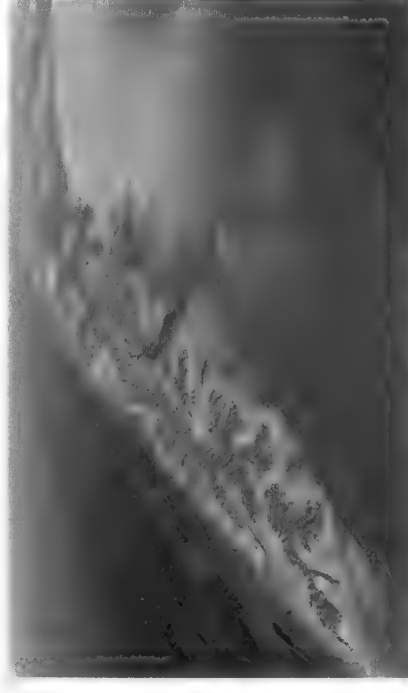
- Assess next steps for engagement in other bioregions in 2019
- DFO contact: Jason Dunham (project lead), Neil Ladell (engagement)

Scott Islands Marine National Wildlife Area

- Became the first marine National Wildlife Area under Canada's Wildlife Act on June 27th, 2018; led by ECCC
- Fishing within the mNWA will continue to be managed by DFO
- To support the conservation objectives of the Scott Islands mNWA, DFO published a Notice of Intent to signal DFO's intention to develop *Fisheries Act* regulations to restrict certain fisheries that pose a risk to seabirds
- Proposed FA regulation would:
 1. Prohibit fishing of 3 key forage fish species (sand lance, saury, and krill)
 2. Prohibit groundfish bottom trawling
 3. Restrict other fishing activities that would pose a risk to the conservation objective
- DFO contact: Amy Mar (FM, SFF)



Gwaii Haanas National Marine Conservation Area



- Cooperatively managed by the AMB and activities will be guided by the land-sea-people management plan
- Draft Land-Sea-People management plan and zoning plan closed to consultation in July
- DFO contact: TBD, Amy Mar (FM, SFF) in interim

Southern Strait of Georgia National Marine Conservation Area

- Proposed boundary released 2011
- Feasibility assessment is underway, will be posted on Parks Canada website
- Led by Parks Canada, no DFO contact at this time



Marine Mammal Regulations

(Pursuant to Fisheries Act)


- Regulations amended to protect marine mammals on all coasts of Canada came into effect mid 2018.
- Regulations include:
 - Minimum distance of 100m from most whales, dolphins, porpoises to protect from human disturbance
 - 200m approach distance for all killer whales
 - Reporting requirement of incident of a vessel accidentally striking a mammal or entanglement
- [http://laws-lois.justice.gc.ca/eng/regulations/sor-93-](http://laws-lois.justice.gc.ca/eng/regulations/sor-93-56/)

56/

Marine Mammal Reporting

- Reporting of marine mammal interactions are required in conditions of license
- Interactions include those that negatively impact the mammal, such as entanglement, collision, and death

- Form: <http://www.dfo-mpo.gc.ca/fm-gp/mammals-mammiferes/report-rapport-eng.html>



Fisheries and Oceans
Canada

Pêches et Océans
Canada

SCHEDULE B

PROTECTED B

SCHEDULE V

MARINE MAMMAL INTERACTION FORM

Please fill out every section below. Once submitted this form must be submitted to DFO per instructions on page 2

<p>Interaction Information</p> <p>Interaction Date _____</p> <p>Interaction Time _____</p> <p>Location _____</p> <p>Latitude _____ Deg Min</p> <p>Longitude _____ Deg Min</p>	<p>Individual Observing the Interaction</p> <p>Name _____</p> <p>Address _____</p> <p>Phone _____</p> <p>Email _____</p> <p>Vessel Name _____</p> <p>Target Species _____</p> <p>Gear Type _____</p>	<p>Incident Type</p> <p><input type="checkbox"/> Dead Animal</p> <p><input type="checkbox"/> Entanglement</p> <p><input type="checkbox"/> Collision</p> <p><input type="checkbox"/> Harassment</p> <p><input type="checkbox"/> Live Stranding</p> <p><input type="checkbox"/> Shooting</p> <p><input type="checkbox"/> Sick or Injured</p> <p><input type="checkbox"/> Depredation</p> <p><input type="checkbox"/> Other (explain) _____</p>	<p>Animal Condition</p> <p><input type="checkbox"/> Appears Healthy</p> <p><input type="checkbox"/> Sick or Injured</p> <p><input type="checkbox"/> Dead</p> <p><input type="checkbox"/> Unknown</p>
<p>Species (check one)</p> <p><input type="checkbox"/> Dolphin / Porpoise</p> <p>Species code _____</p> <p><input type="checkbox"/> Whalid</p> <p>Species code _____</p> <p><input type="checkbox"/> Seal / Squalodon</p> <p>Species code _____</p>	<p>ID Confidence</p> <p><input type="checkbox"/> Certain</p> <p><input type="checkbox"/> Probable</p> <p><input type="checkbox"/> Possible</p> <p><input type="checkbox"/> Uncertain</p>	<p>Number of Animals</p> <p>Minimum # _____</p> <p>Maximum # _____</p> <p>Best Estimate _____</p>	<p>Support Material</p> <p><input type="checkbox"/> Photos</p> <p><input type="checkbox"/> Video</p> <p><input type="checkbox"/> Samples</p> <p><input type="checkbox"/> Other _____</p>
<p>Body Length</p> <p><1m (<3 ft) _____</p> <p>1.1-1.5m (3.5-5 ft) _____</p> <p>1.6-2m (5.3-7 ft) _____</p> <p>2.3m (7.5-8 ft) _____</p>		<p>Other</p> <p>3.8m (10-25 ft) _____</p> <p>8.15m (25-50 ft) _____</p> <p>16.26m (50-80 ft) _____</p> <p>>26m (>80 ft) _____</p>	

Comments: (date, colour, markings, behaviour)

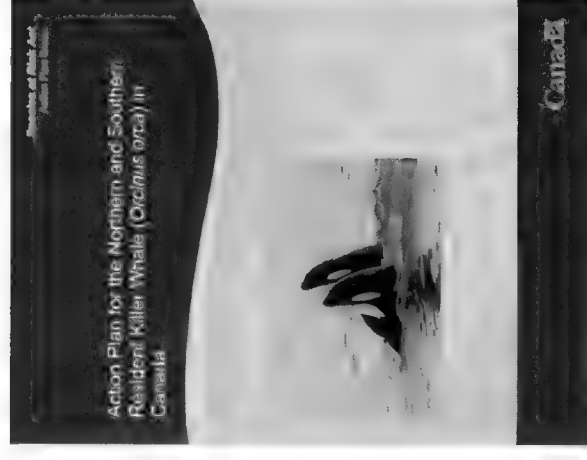
Comments: (time, actions, people involved, etc)

US Marine Mammal Protection Act (MMPA)

- Requires export fisheries to meet US standards related to marine mammal bycatch
- By March 2021, exporting fisheries need to show they have measures in place to implement the requirements of the Act
 - Mandatory reporting of all marine mammal bycatch
 - Bycatch limit and measures implemented to reduce marine mammal bycatch to insignificant levels over the long term
- DFO/NOAA technical meeting on MMPA this fall, followed by regional roundtable meetings and gear-based workshops

Action Plan for the Northern and Southern Resident Killer Whale in Canada

- Finalized in 2017
- Identified 98 Recovery Measures to address threats and recover both populations
 - Includes measures to identify additional CH
- Multiple recovery initiatives currently underway for RKW to address each of the key threats



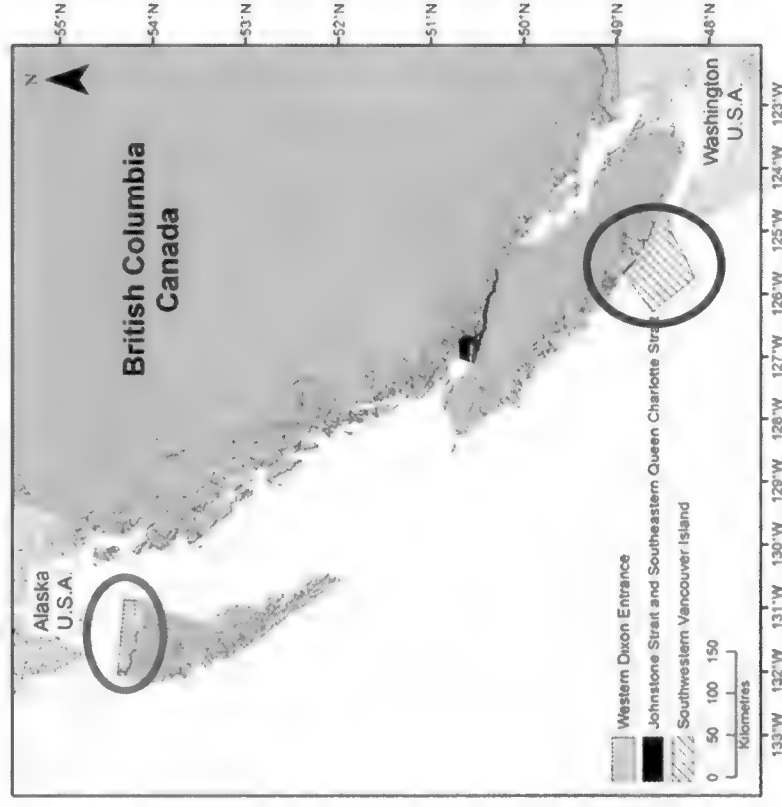
Resident Killer Whale Recovery Strategy Amendment

- New Science advice detailing additional critical habitat
- 60-day public comment period currently underway (ends November 3)
- Legal protection within 180 days
- Amendment ID's 2 additional areas (western Dixon Entrance and continental shelf off southwestern VI) and clarifies features, functions, attributes of Critical Habitat

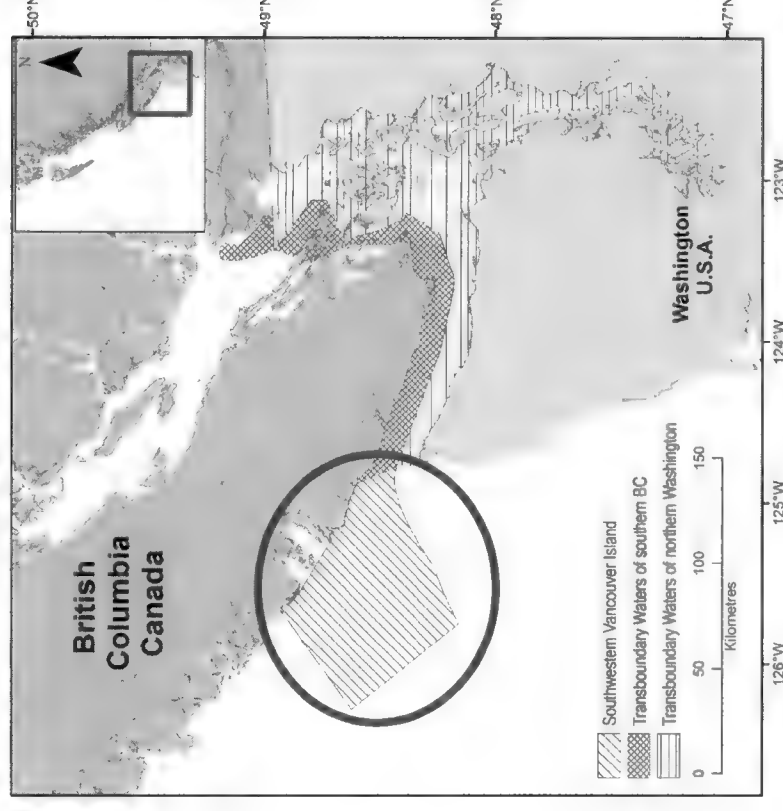
SARA RKW Recovery Strategy Amendment

Two additional areas identified for consideration as CH

NRKW



SRKW



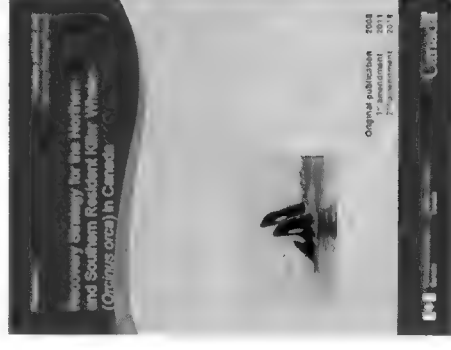
SARA RKW Recovery Strategy Amendment

- Provides clarification of the functions, features and attributes for all CH identified for NRKW and SRKW
- Features/attributes:
 - Availability of Chinook Salmon, Chum Salmon and other important prey species
 - Acoustic environment
 - Water quality
 - Physical space around whales (200m)
 - For NRKW: suitable physical habitat to allow for beach rubbing behaviour
- Support the feeding and foraging, reproduction, socializing, resting and beach rubbing functions of NRKW and SRKW CH
- Applies to the existing and proposed CH areas



SARA RKW Recovery Strategy Amendment – Consultation

- 60-day online public comment period for section 7 (critical habitat) of the proposed amended Recovery Strategy (through November 3, 2018)
- Document is available on the Species at Risk Public Registry: http://registrelep-sararegistry.gc.ca/document/default_e.cfm?documentID=1341



- Comments can be provided via e-mail to: SARA/LEP.XNCR@dfo-mpo.gc.ca

Shark Reporting

- Shark bycatch clause is in IFMP, and will be in 2018/19 license conditions
- Code of conduct for shark/basking shark encounters
- More information: <http://www.dfo-mpo.gc.ca/species-especes/publications/sharks/npoa-sharks-pan-requins/index-eng.html>
- Lead: Heather Brekke, SARA marine team



Basking Shark (*Cetorhinus maximus*)
Public Domain Photo courtesy Chris Gotschalk via Wikimedia Commons



Vibrio cholerae



- Pacific Fishery Management Areas 14-1, 14-4, and 14-5 closed to fishing for herring eggs by handpicking March 23, 2018.
- Closure based on advice received from Vancouver Island Health Authority regarding concern for human health with multiple reports of diarrheal illness associated with herring egg consumption from product harvested on substrate in the area.
- Risk Assessment is being undertaken by Health Canada, late October 26. Results of RA will be shared. Closure still in place.

Norovirus

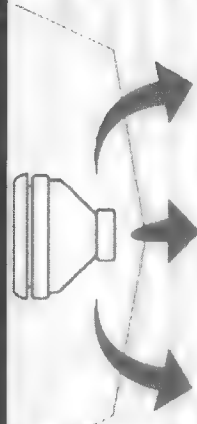
- Noroviruses found in the stool or vomit of infected people. Very contagious and spread easily from person to person. Shellfish like oysters may be contaminated by sewage in water before they are harvested.
- BC Centre for Disease Control report on 2018 norovirus outbreak: <http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Guidelines%20and%20Manuals/Health-Environment/2018%20norovirus%20outbreak%20linked%20to%20vessels%20and%20oysters.pdf>
- 176 cases of gastrointestinal illness linked to oyster consumption were reported in three provinces: British Columbia (137), Alberta (14), and Ontario (25), between mid-March and mid-April 2018. Reported eating raw oysters from the south and central parts of Baynes Sound
- Implicates high levels of precipitation, commercial fishing vessels (“likely”) and surrounding sewage/water treatment plants (“less likely”)

Norovirus

Federal and provincial Regulatory partners and Herring industry working to reduce risks and improve compliance with regulations.



Complying with Sewage Discharge Regulations



Transport Canada regulations prohibit the discharge of raw sewage directly into the water. Your sewage discharge affects fish and bivalve shellfish (oysters, clams and mussels), causing contamination which can threaten human health. A violation of this regulation can carry a fine of up to \$1 million or up to 18 months of imprisonment, or both.

Here's what you can do to comply:

OPTION 1


Use a MARINE SANITATION DEVICE, or discharge 3nm offshore

OPTION 2


Use a HOLDING TANK and PUMP-OUT STATION
(Visit www.stopic.com/links to find one near you)

OPTION 3

Use a TEMPORARY STORAGE like a porta-potty



Contact Transport Canada's Office of Boating Safety at 604-566-2681 or email: TC.PAC.TM.OBS-BSN.TC@TC.GC.CA about regulatory requirements. Vessel Pollution and Dangerous Chemicals Regulations are online at: <http://www.laws-lois.justice.gc.ca/eng/regulations/SOR-2012-69/page-1.html>



National Fishery Monitoring Policy: Consultation open Oct 11, 2018 to Jan 25, 2019.

Scope: Applies to all commercial, recreational and Indigenous wild capture fishing activities in Canadian fisheries waters. It also applies to fisheries licensed and/or managed by DFO that operate outside of Canada's exclusive economic zone.

<http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/comm/consultation-nat-fsh-eng.htm>

Contacts:

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Ottawa ON K1A 0E6

Email: DFO.NAT.FMP-PSP.NAT.MPO@dfo-mpo.gc.ca

Jonathan Thar

Regional Fisheries Monitoring Coordinator
Fisheries Management Branch

Fisheries and Oceans Canada | Government of Canada
Tel: 604-666-1082 | Jonathan.Thar@dfo-mpo.gc.ca

Fishery Monitoring Risk Assessments

- Strategic Framework for Fishery Monitoring and Catch Reporting in the Pacific Fisheries (2012) requires that all fisheries in BC and Yukon undergo risk assessments:
 - identify appropriate monitoring and reporting requirements relative to the ecosystem risks and other resource management considerations that each fishery presents; and
 - collect the information necessary to manage the fishery sustainably.
- Committed to 2018/19 for 'Round 1' Fisheries
- Each assessment identifies the estimated level of risk that a specific fishery poses to the:
 - Main species/stocks targeted by a fishery
 - Species taken as by-catch
 - Ecological communities

Roe Risk Assessment: Key Findings (draft)

- Risk to main species – 4 (moderate)
- Risk to bycatch/community & habitat – 2 (low)
- Overall – 4 (moderate)
- ✓ Target monitoring level (roe seine/F&B) – enhanced (and current)
- ✓ Target monitoring level (roe GN) – generic (and current)



SOK Risk Assessment: Key Findings (draft)

- Risk to main species: 2 (low)
- Risk to bycatch: 2 (low – closed pond); 0 (open pond)
- Risk to community/habitat: 4 (moderate – closed pond); 2 (low – open pond)
- Overall: 4 (moderate – closed pond); 2 (low – open pond)
- ✓ Target monitoring level (closed pond): generic (and current)
- ✓ Target monitoring level (open pond): low (currently generic)



Risk Assessments: Next Steps

- Comments/changes from commercial harvesters incorporated into the RAs
- Include in IFMP for broader consultation
- 'Final' draft in 2018/19 IFMP for comment
- FSC fisheries Risk Assessments planning underway.



Safety at Sea

- DFO will work with regulatory partners and commercial harvesters to advance safe fishing practices.
- Transport Safety Board report on 2017 sinking of seine fishing vessel “Miss Cory”.

• <http://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwiLp7K8vYb eAhWNmeAKHVySCtkQFjAAeqQBhAB&url=http%3A%2F%2Fwww.tsb.gc.ca%2Feng%2Frapports-reports%2Fmarine%2F2017%2Fm17p0052%2Fm17p0052.asp&usq=AOvVaw03vJTpcWI9y0NkRCkV1RCe>



15 minutes
BREAK



Fisheries Act Amendments

- To be updated for Oct 17

Haida Gwaii Herring Rebuilding Plan

- **Draft Gwaii Haanas Land-Sea-People Management Plan**

“Restore habitats, species, food webs. A herring rebuilding strategy and implementation plan are collaboratively developed by 2018”.

- **Sustainable Fisheries Framework, Precautionary Approach**

“when a stock has reached the Critical Zone, a rebuilding plan must be in place with the aim of having a high probability of the stock growing out of the Critical Zone within a reasonable timeframe.”

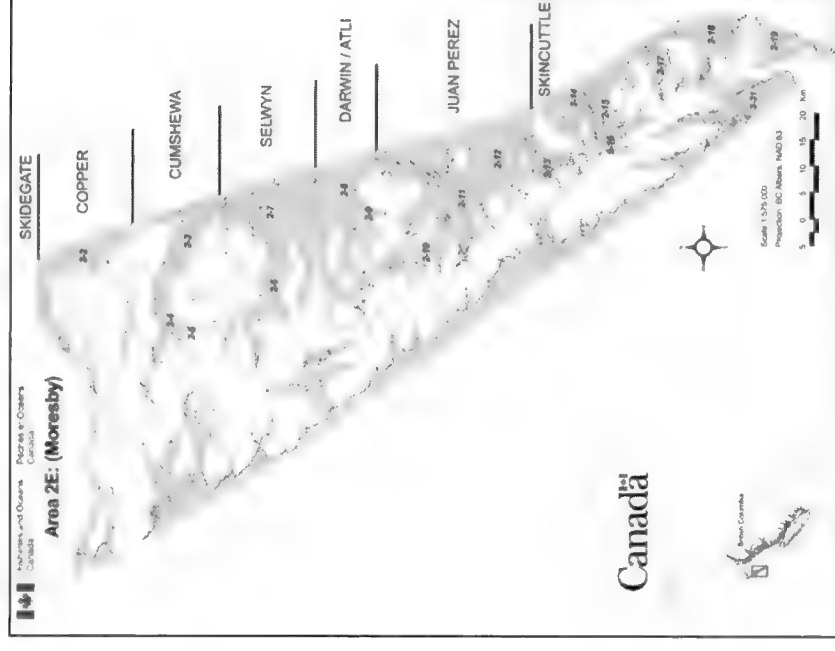
- **OAG Report on “Sustaining Canada’s Fish Stocks” (2016)**

Identified gaps in implementing the SFF and PA Framework.

DFO has committed to aligning fisheries with the Policy, including development of a rebuilding plan for Haida Gwaii herring

Haida Gwaii Herring Rebuilding Plan

- Haida-DFO Technical Working Group: Developing TOR.
- Simulation evaluations planned for Haida Gwaii in 2018/19 MSE cycle.
- Rebuilding Plan to be completed in 2020/2021.



Update on Pacific Herring Renewal and Management Strategy Evaluation

Element 1: Management Strategy Evaluation (MSE)

July 2018 CSAS simulation results

Application of MSE results for the 2018/19 cycle

Next phase of MSE - update

Element 2: Fisheries Management Reforms **Element 3: Stock Assessment Program**

Pacific Herring Renewal Element #1 Management Strategy Evaluation

What was done for the July 2018 CSAS MSE analysis?

Discussion of objectives between Science, FM, First Nations, and Industry:

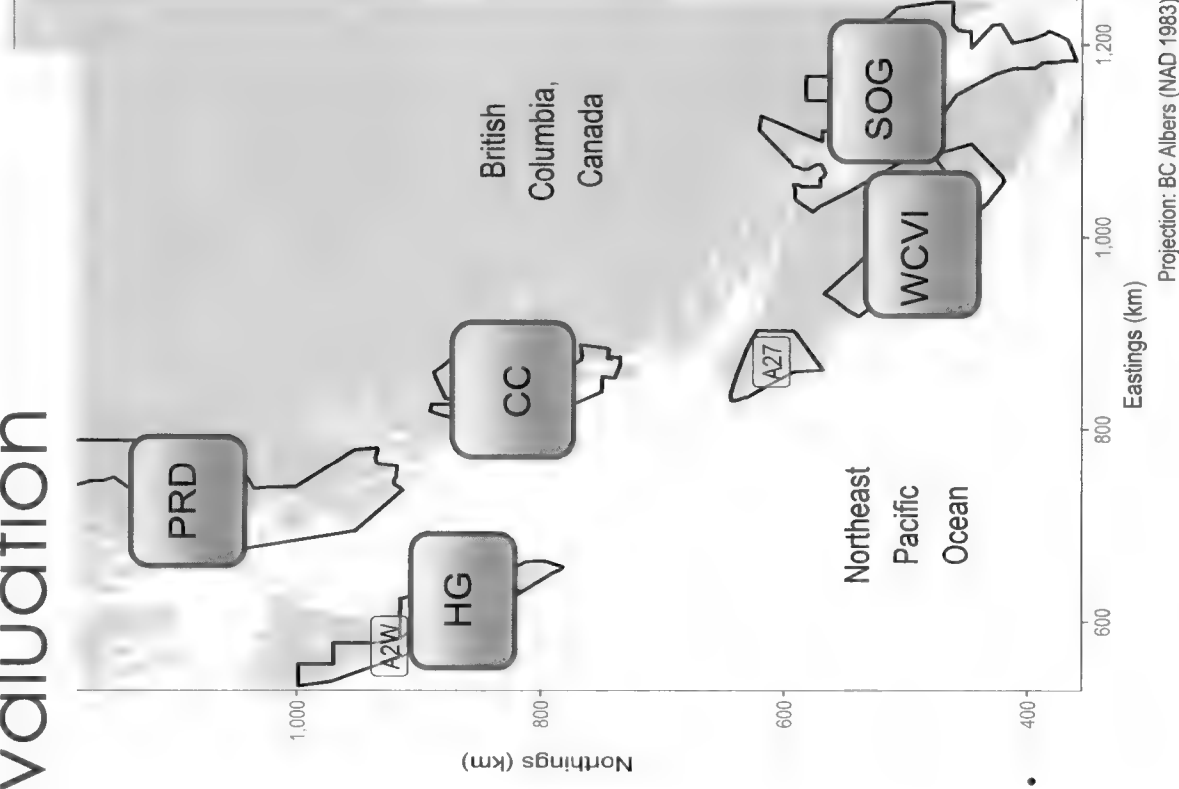
- **Conservation objective** related to Limit Reference Point (LRP)
- **Biomass objectives** related to Upper Stock or Target Reference Points (USR, TRP)
- **Yield objectives** related to stable catch and maximum average catch

Pacific Herring Renewal Element #1 Management Strategy Evaluation

Scope for MSE Cycle 1
approved and completed:
Simulation results for WCVI
and SOG areas

Next Phase (2019)

- MSE Cycle 2: Simulation evaluation for other stock areas
- Engagement of refined objectives for WCVI and SOG.



Pacific Herring Renewal Element #2 Fisheries Management Reform - Update

- Review of licence fees
 - Review of the current pooling/
licensing
- } Linked
- Summer 2018 HIAB proposal for harmonization of roe seine and Food and Bait licences not supported for 2018/2019 season. DFO unfunded pressure for licence fee relief on one-off fishery approach.

Pacific Herring Renewal Element #2 Fisheries Management Reform - Update

Management Platform:

- Mobile on grounds observer pilot project in SOG Roe Seine for 2018 season
- Results:
 - First Nations (A-Tlegay) provided platforms and were integrated into existing monitoring program with JO Thomas
 - Some limited utility for small scale/shoulder seasons
 - First Nations interested in continuing involvement/application
 - Currently unfunded for 2019 (\$15k in 2018)
 - If funded by Dec 2018, pilot could be continued in 2019

Risk Assessments:

- Review of fishery monitoring requirements - drafts complete Nov 2018

Pacific Herring Renewal Element #3 Stock Assessment Program - Update

- Pacific Herring stock assessment is the largest unfunded science stock assessment program in Pacific Region (\$1.4 million).
- Changes to survey program and data collection should first be simulation tested- to demonstrate implications and risk to performance of management procedures against objectives.
- Prioritization of work: Simulation-testing of MPs with reduced survey data needs to be discussed within the current work plan

Overview of Science Response

- 11:15 – 11:45AM
- (stock assessment and forecast) results and planning for 2019 stock assessment

IFMP and Commercial Fishing Plans Considerations by Stock Assessment Area

Objective: to outline the context and key decisions required for the upcoming 2018/19 Pacific Herring season, including:

1. Flag key decisions
2. Build an understanding of considerations for each stock area
3. Identify further information needed for decision making on harvest approach
4. Discuss key points status relative to planning timeline

CSAP Meeting July 25/26 Science Response Webinar October 10

For ALL AREAS:

- AM2: Scaling the assessment with values of $q < 1$ is likely to result in larger absolute assessment errors.
- Updated production analysis provided for all areas.
- Candidate Upper Stock References (USR) also presented.
- Spatial spawn distribution provided.
- Fixed cutoff values not provided:
 - Calculated outside of the current assessment model, not updated since 1996, and substantial changes to the assessment model

Area Specific Harvest Advice



- **HG, PRD, CC:** no area-specific simulation-evaluation analyses.
- Harvest advice for these areas is provided in the form of **decision tables** (same as last year)



- **SoG, WCVI:** Harvest advice applies the results of the MSE simulation-evaluation completed July 2018.

Key Decisions and Information for Planning

This is a period of transition with some areas MSE simulations completed.

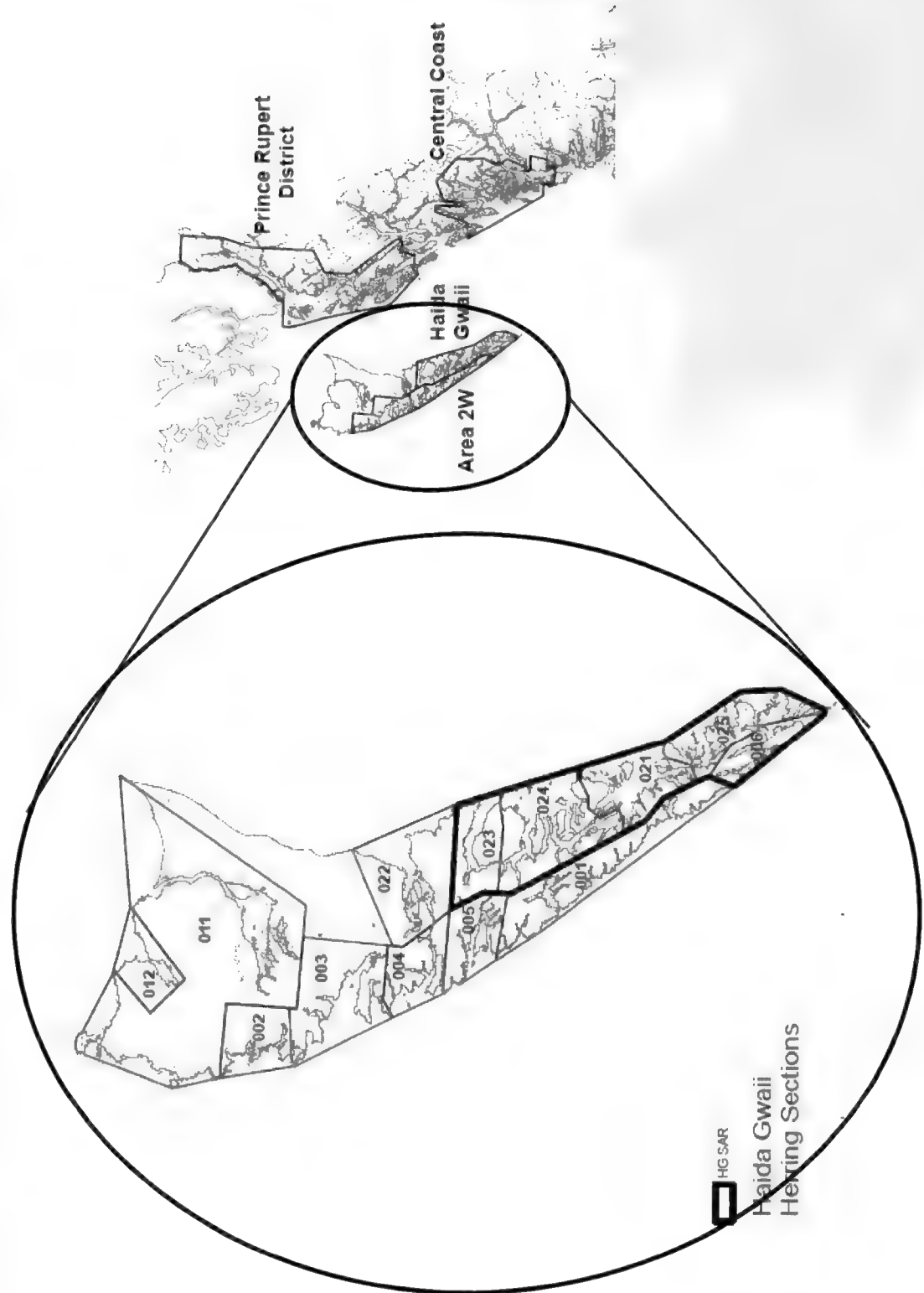
The LRP has been identified for 5 major stocks, and will continue to inform decision making for 2018/19.

Area specific information: stock trends, age composition, natural mortality, recent removal rates, objectives.

Further engagement needed and planned to identify measurable objectives associated with both LRPs and target reference points for Pacific Herring.

*Note “t” = metric tons, “tons” = imperial tons

Haida Gwaii (Areas 1 and 2) and 2W



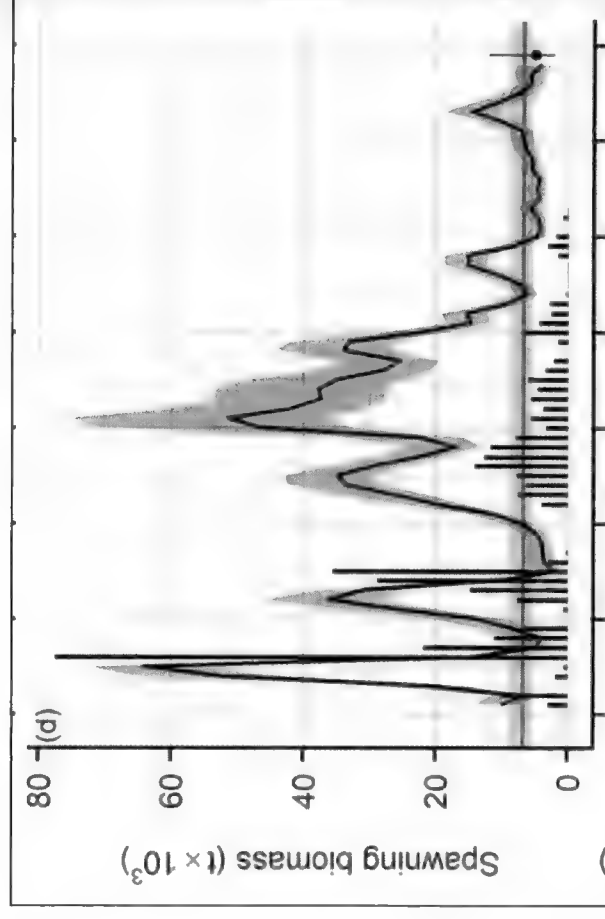
Haida Gwaii

- Low biomass, low productivity state since 2000, little evidence of sustained stock growth
- In the absence of fishing, 2019 spawning biomass is forecast to be:
 - 4,966t
 - Below LRP of 0:3SB₀ with 72.7% probability in the absence of fishing
- DFO has committed to develop and implement a rebuilding plan for end of fiscal year 2020/2021.
- Harvest recommendation is 0t

Trend line=estimated spawning biomass

Red line/envelope=LRP with C.I.

Black bars=commercial catch



Haida Gwaii (Areas 1 and 2) and 2W

2018 Fisheries:

- FSC only

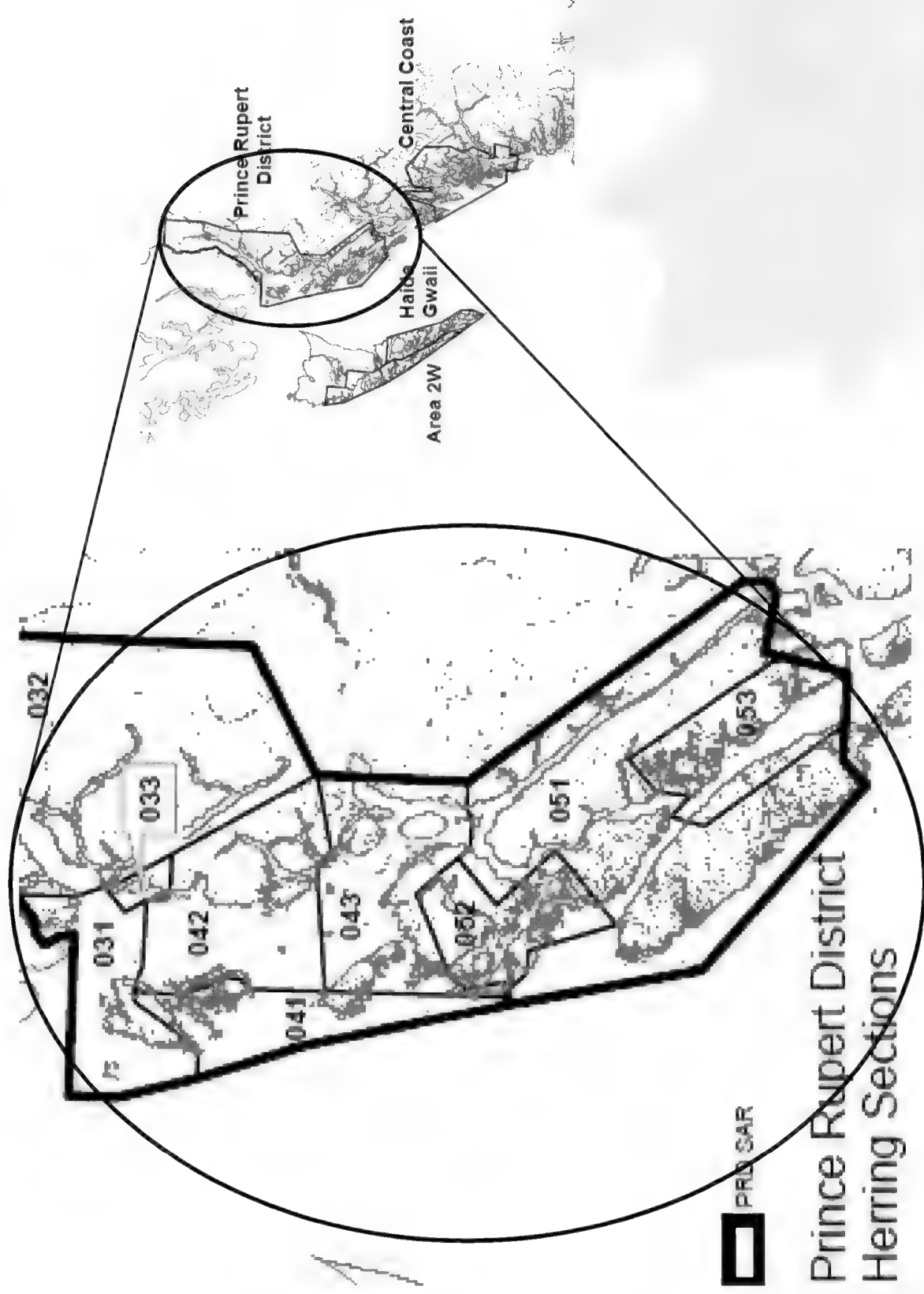
Stock Assessment Resources:

- 19-day spawn reconnaissance charter
- 25-day biological sampling/test charter (incl. 2W)*
- 18-day dive spawn charter*
- 6-day surface spawn charter (2W)
- FN activities: CHN sounding vessel (unconfirmed)

DFO FM Resources:

- TBA

Prince Rupert District (Areas 3 to 5)



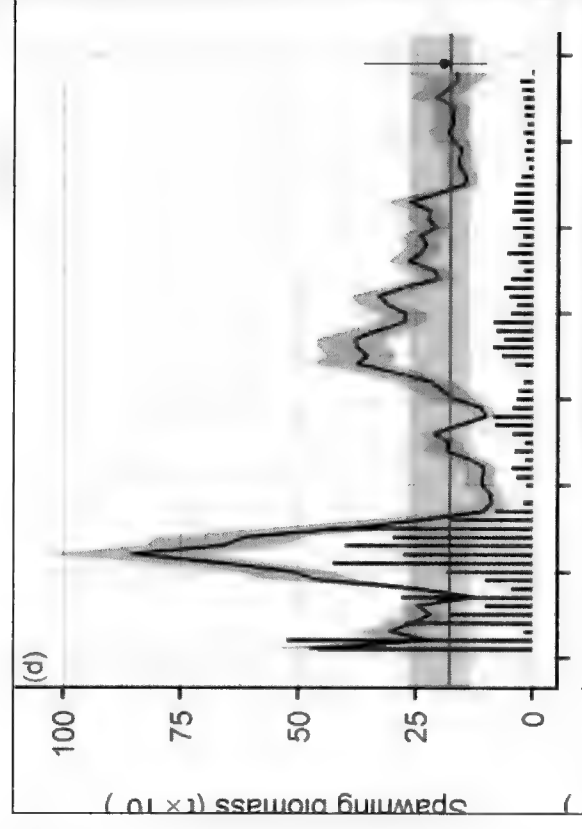
Prince Rupert District

- No sign of growth and is estimated to fluctuate at or near $0.3SB_0$
- In the absence of fishing, 2019 spawning biomass is forecast to be:
 - 19,347t
 - Below LRP of $0.3SB_0$ with 43.3% probability
- Harvest options presented as probabilistic decision tables
- TAC options relative to 10% and 20% target harvest rates
- Spawning biomass relative to the assessment model estimate of the LRP

Trend line=estimated spawning biomass

Red line/envelope=LRP with C.I.

Black bars=commercial catch



Prince Rupert District (Areas 3 to 5)

2018 Fisheries:

- FSC: 600 tons expected use
- SOK: 10 SOK licenses for 1000 tons expected use
- F&B: 0
- Special Use: 0
- Roe (Seine and Gillnet): 2, 258 tons

Stock Assessment Resources:

- Spawn flights
- 13-day biological sampling/test charter (Kitkatla)*
- 13-day biological sampling/test charter (Big Bay)*
- 20-day dive spawn charter*

Prince Rupert District (Areas 3 to 5)

DFO FM Resources:

- TBA

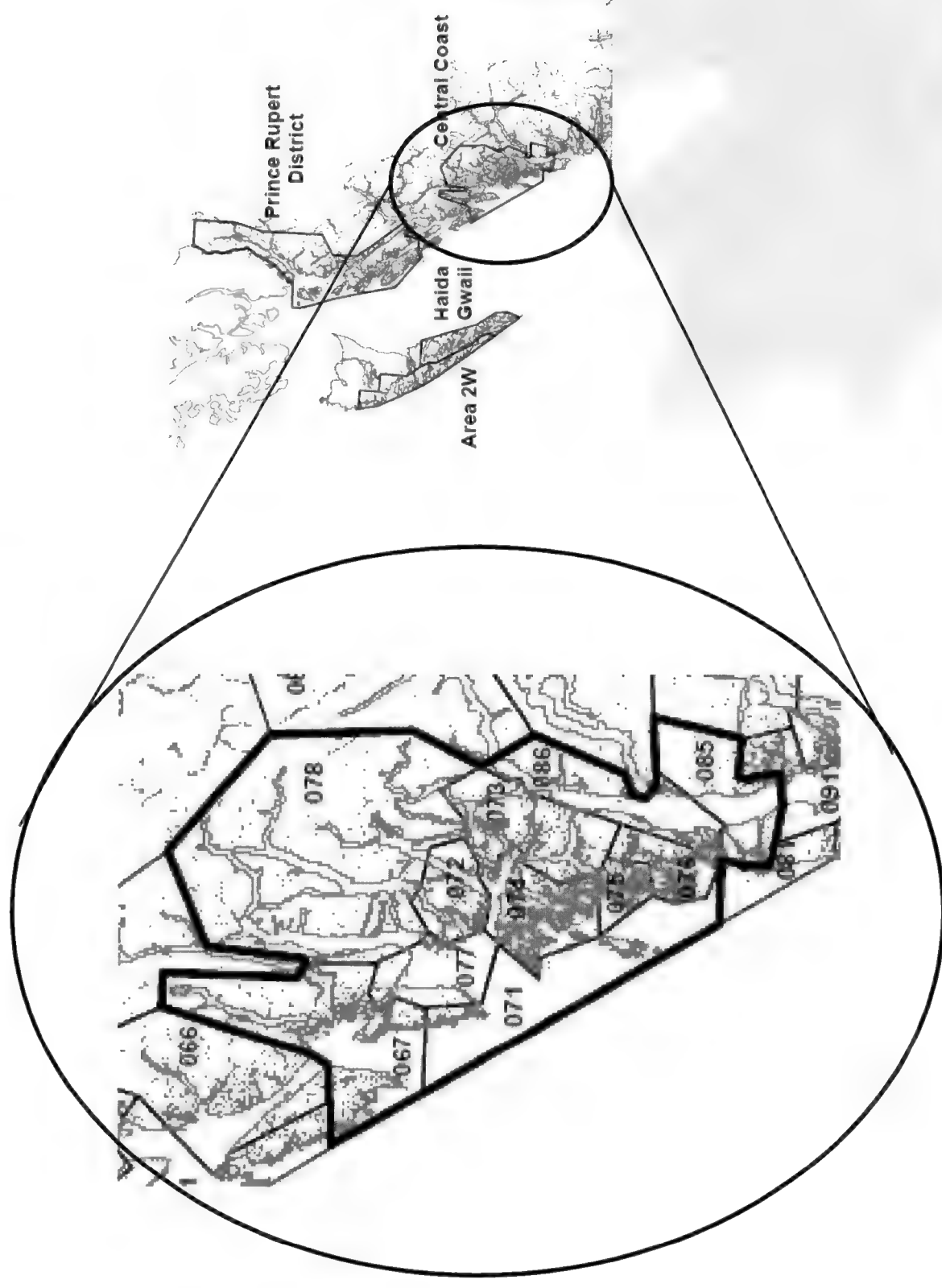
Other Resources:

- Lax Kw'alaams First Nation fisheries program in Big Bay
- Gitxaala First Nation fisheries observer and survey assistance in Kitkatla Inlet

Questions:

- What should be considered when thinking about harvest planning in this area?
- How should LRP be considered for harvest planning?
- What recommendations would you make for harvest planning, and why?

Central Coast (Areas 6-8) and Area 10



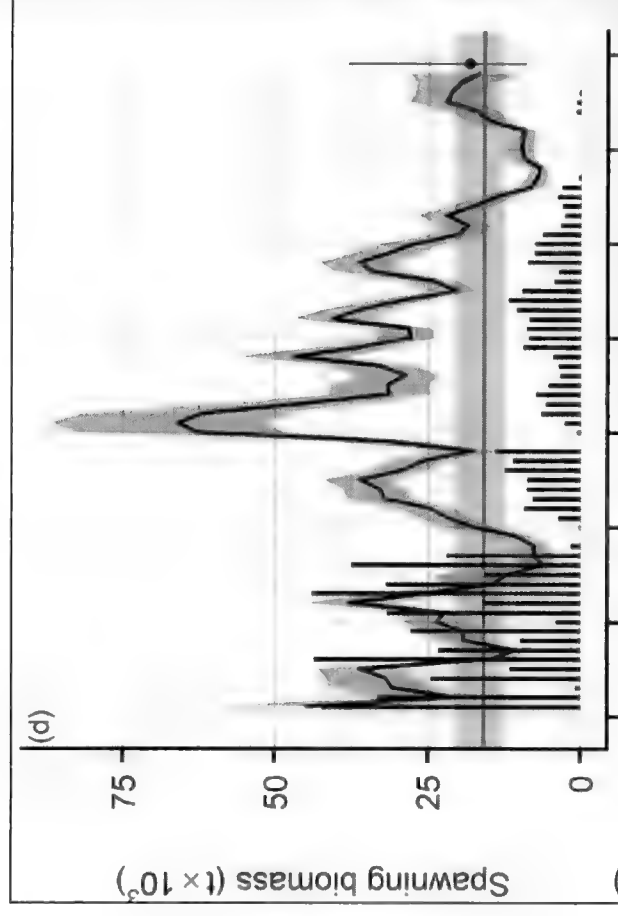
Central Coast

- In the absence of fishing, 2019 spawning biomass is forecast to be:
 - 18,267†
 - Below the LRP of 0:3SB₀ with 37.1% probability
- Harvest options presented as probabilistic decision tables
- TAC options relative to 10% and 20% target harvest rates
- Spawning biomass relative to the assessment model estimate of the LRP

Trend line=estimated spawning biomass

Red line/envelope=LRP with C.I.

Black bars=commercial catch



Central Coast (Areas 6 to 8) and Area 10

2018 Fisheries:

- FSC: 600 tons
- SOK: 6 SOK licenses and Heiltsuk allocation 3 licenses in Area 10
- Roe (Seine): 0 tons

Stock Assessment Resources:

- No early biological sampling/test charter
- 21-day biological sampling/test charter (HTC AFS program)
- 21-day dive spawn charter*
- 12-day dive spawn charter* (SOG/CC split charter)
- FN activities: GN sounding vessels; Kitasoo dive survey

Central Coast (Areas 6 to 8) and Area 10

DFO FM Resources:

- TBA

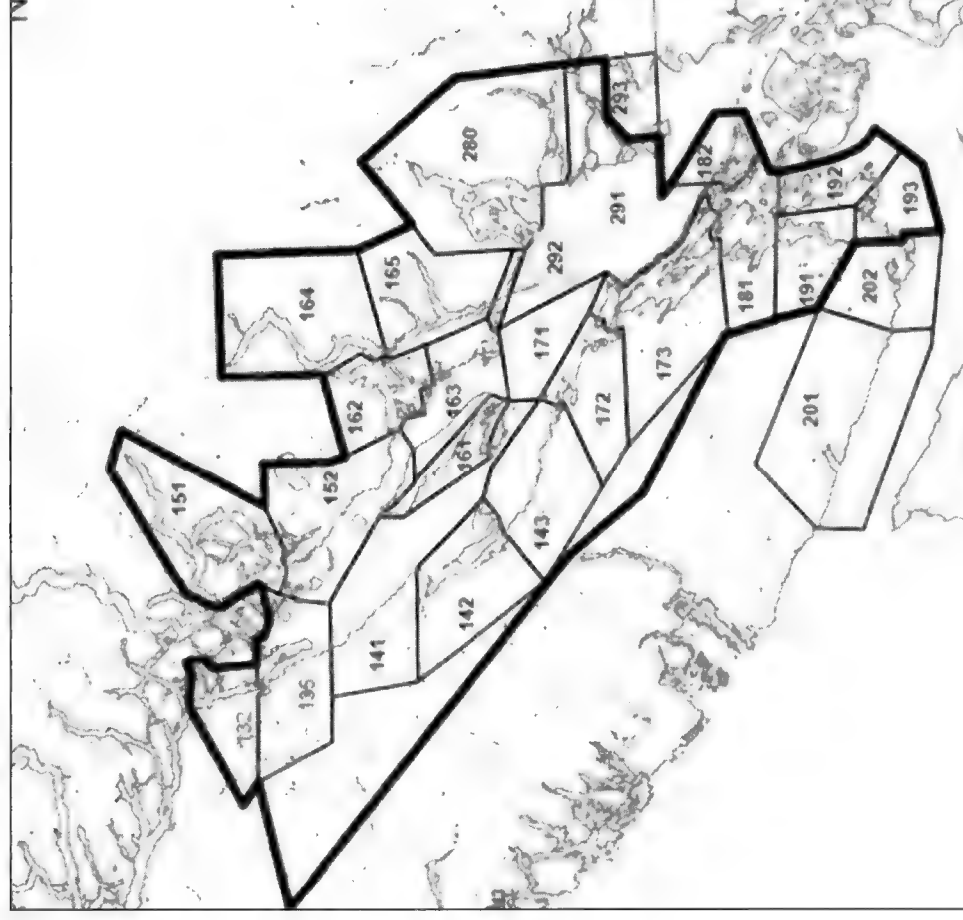
Other Resources:

- Heiltsuk Fisheries program as designates on test boat and management platform, Heiltsuk communications coordinator
- CCGS Vector March 15th to April 6th
- Joint Management Plan with the Heiltsuk
- Kitasoo Herring Management Plan
- Area 10 - GNN Herring Spawn Monitoring & Dive Surveys

Questions:

- What should be considered when thinking about harvest planning in this area?
- How should LRP be considered for harvest planning?
- What recommendations would you make for harvest planning, and why?

Strait of Georgia (Areas 13 to 18, 29)

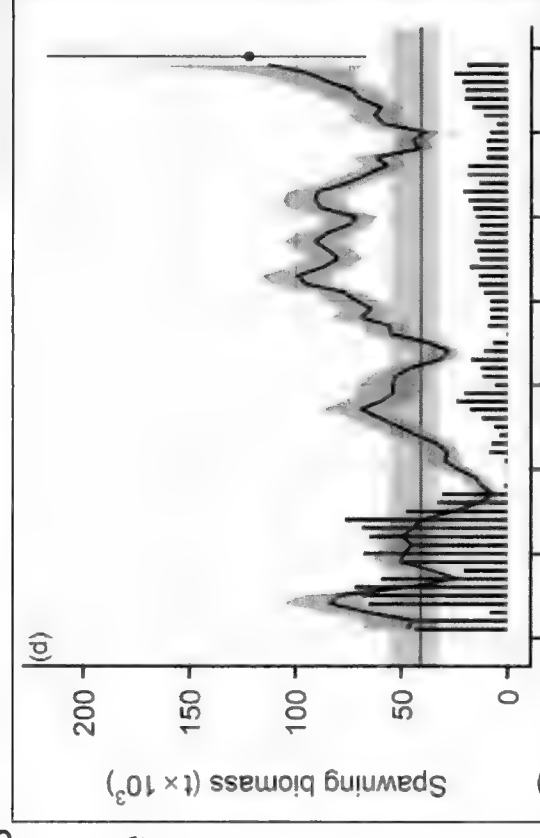


Strait of Georgia

- Harvest recommendations for SoG stock are provided by application of a management procedure (MP) that utilizes stock assessment estimates of forecast spawning biomass and:
 1. operational control points at (0.3, 0.6) of SB_0
 2. 20% target harvest rate, and maximum catch cap of 30,000t
- The 2019 recommended catch calculated by applying the MP is **25,791t**

- First Nations requested the areas south of Nanaimo (and 29-5), and Sunshine Coast be closed due to limited observed spawn.

Trend line=estimated spawning biomass
 Red line/envelope=LRP with C.I.
 Black bars=commercial catch



Strait of Georgia (Areas 13 to 18, 29)

Key Fisheries

FSC:

- Whole herring, spawn on boughs, spawn on seaweed
- Limited spawn on kelp due to limited distribution of macrocystis)
- Lack of spawning stocks in area 17S in recent years has impacted FSC access

Commercial:

• **Roe herring:**

- Largest seine and gillnet fisheries on the coast
- Effort concentrated in Area 14 & 17N due to recent fish distribution
- Sea lions impacts to testing and fishing efforts in recent years

• **Food and Bait:**

- Herring catches increased and make up roughly a third of the commercial catch in recent years

• **Special Use**

- Fishery is only active in SoG area
- Small operations with limited and specific marketing needs

Strait of Georgia (Areas 13 to 18, 29)

Stock Assessment Resources:

- Spawn flights
- 27 day biological sampling/test charter
- 21 day dive spawn charter
- 12 day dive spawn charter (SOG/CC split charter)
- 15 day shore-based dive spawn team (WCVI/SOG split charter)

DFO FM Resources:

- Resource Managers – 2 seine, 1 gillnet, 1 Food and Bait, 1 Special Use

- DFO funded management vessel – 15 day

Other Resources:

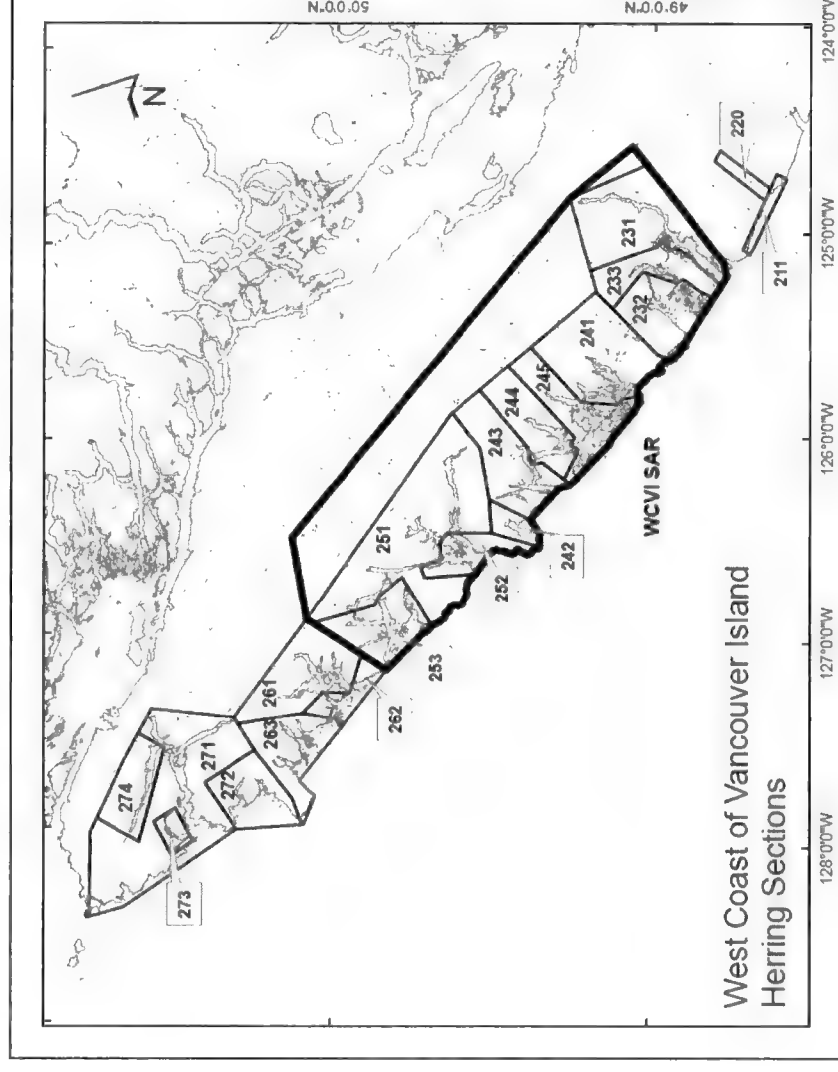
- First Nation's communications coordinator – funding TBA

Strait of Georgia (Areas 13 to 18, 29)

Questions:

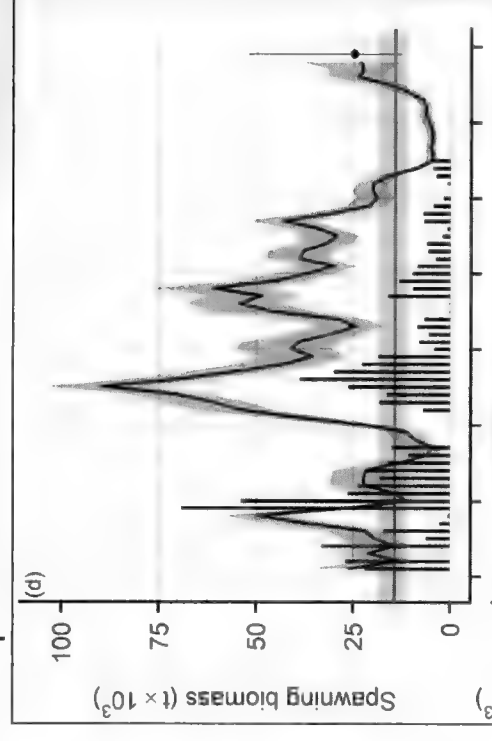
- What should be considered when thinking about harvest planning in this area?
- How should LRP be considered for harvest planning?
- What recommendations would you make for harvest planning, and why?

West Coast Vancouver Island (Areas 23, 24, 25)



West Coast Vancouver Island (Areas 23, 24, 25)

- Harvest recommendations for WCVI are provided by application of a management procedure (MP) that utilizes stock assessment estimates of forecast spawning biomass and:
 1. operational control points at 0.5, 0.6 of SB_0
 2. 10% target harvest rate, and maximum catch cap of 2,000t
- The 2019 recommended catch calculated by applying the MP is **671t**.
- For a rebuilding stock a "slow-up" MP would be designed to delay fishery openings for an additional predefined number of years (e.g., 3-5) when the spawning biomass is estimated to be above the lower OCP in order to provide higher confidence of stock growth. Trajectory for WCVI herring is both gradual and erratic.



West Coast Vancouver Island (Areas 23, 24, 25)

Key Fisheries

FSC:

- Lack of spawning stocks in area 17S in recent years has impacted FSC access
- Area 23 - Tseshaht & Hupacasath First Nations
- Area 24 - Tla-o-qui-aht, Ahousaht, and Hesquiaht First Nations
- Area 25 - Mowachaht/Muchalaht, Ehattesaht, and Nuchatlaht
- Treaty Fisheries: Area 23 - Maa-nulth First Nations

Commercial:

- **SOK:**
 - Area 23/24 – 2 licences; Area 25 – 2 licences
 - No harvest since 2006
- **Roe (Seine/Gillnet)**
 - Typically occurs in Barkley Sound (A23) and/or Esperanza Inlet (A25)
 - No harvest since 2006
 - T'aaq-wiihak (on-going negotiations)

West Coast Vancouver Island (Areas 23, 24, 25)

Stock Assessment Resources:

- Spawn flights
- 20-day biological sampling/test charter
- 15-day dive spawn charter (single team)
- 15-day shore-based dive spawn team (incl. Area 27)

DFO Management Resources:

- Resource Manager – TBA

Other Resources:

- First Nation's herring spawn reconnaissance surveys – funding currently unconfirmed

West Coast Vancouver Island (Areas 23, 24, 25)

Questions:

- What should be considered when thinking about harvest planning in this area?
- How should LRP be considered for harvest planning?
- What recommendations would you make for harvest planning, and why?

Coastwide Metrics by Area

Area	SB ₂₀₁₈	SB ₂₀₁₉	LRP	Rel. LRP (2019)	P SB ₂₀₁₉ < LRP
HG	4032	4966	6778	-1812	0.727
PRD	16,635	19,347	17,740	1607	0.433
CC	16,454	18,267	15,864	2403	0.371
SOG	113,425	122,921	40,884	82,037	0.004
WCVI	23,335	24,799	14,290	10,509	0.096

Units = tonnes

Advice/Recommendations on the Management Approach (fishing areas and harvest levels)



SOK Transferability (nomination)

- Letter to DFO Minister Aug 2, 2018 requesting action on transferability (nomination)
- DFO Response Aug 28: When J licences were first issued, they were made non-transferable with the intent that the licence would revert back to Fisheries and Oceans Canada (DFO) when the licence holder decided to retire from the commercial fishery.
- The restriction on licence nomination in this fishery has been identified as an issue, as some individual fishery participants are no longer able or do not wish to continue to participate in the fishery.
- Consideration for SOK licence reform be developed through the Integrated Herring Harvest Planning Committee (IHHPC).

SOK Transferability (nomination)

Questions:

- What is IHHPC advice on this issue, and why?
- How should planning/development of options be undertaken?
- Who could be involved?



IHHPC Terms of Reference

- TOR work can be time consuming, however effective inclusive governance is needed for an effective body.
- Review and revision (if needed) every three years under existing TOR. How does committee wish to work through this process?
- External interest in the committees (general public groups, observers etc.)
- Some groups such as SOKOA no longer in place.
- Comparison Draft 2016 to 2010 TOR provided.

IHHPC Terms of Reference - Purpose

2016 draft version

The Integrated Herring Harvest Planning Committee (IHHPC) is the primary integrated (multiinterest) forum for **communications, advice and recommendations** to Fisheries and Oceans Canada (DFO) regarding the management of Pacific herring. The committee was created to promote a **representative, effective** advisory process related to herring planning, management and post-season review.

2010 version

The Integrated Herring Harvest Planning Committee (IHHPC) has been established by Fisheries and Oceans Canada (DFO) Pacific Region to promote a more **stream-lined, representative, cross sectoral advisory process** related to Herring harvest planning, management and post-season review.

IHHPC Terms of Reference - Purpose

2016 draft version

The primary aim of the IHHPC is to inform the annual Pacific Herring Integrated Fisheries Management Plan (IFMP) and the development of fishing plans that are coordinated and integrated. The committee also provides a forum for dialogue, advice and recommendations regarding potential management or licensing changes, policy issues and broader strategic initiatives related to Pacific herring. The IHHPC does not have a formal approval capacity.

2010 version

“MANDATE”

The IHHPC is the venue for DFO for cross-sectoral communication and advice on issues related to Herring fisheries in the Pacific Region. This committee provides recommendations to DFO to enhance the coordinated approach to Herring use. Where there are differences they will be documented and communicated to the Department. This committee does not have an approval capacity.

IHHPC Terms of Reference - Purpose

2016 draft version

Purpose

The IHHPC is not intended to replace or fully discharge DFO's obligations with respect to consultation with First Nations. Recommendations regarding Food, Social and Ceremonial (FSC) harvest plans or fisheries are not within the scope of the IHHPC and are the focus of bilateral consultation between DFO and First Nations. However, it is the Department's view that the IHHPC can help support and inform consultation between DFO and First Nations, in part, by helping identify and inform issues that should be the focus of bilateral consultation.

2010 version

"MANDATE" continued

Recommendations of Food, Social and Ceremonial (FSC) harvest plans is not within the scope of the IHHPC; this remains within the scope of the bilateral relationship between First Nations and DFO.

IHHPC Terms of Reference - Purpose

2016 draft version

- IHHPC also provides a venue for First Nations and other sectors/stakeholders to share views and **better understand each other's interests**. In doing so, the IHHPC can also serve as a forum for identifying and **addressing potential conflicts**.
- This Terms of Reference detail the principles, mandate and operational aspects under which IHHPC will function. They will be reviewed by the IHHPC **every two (2) years** and may be amended as required.

2010 version

THE GOAL:

The goal of the IHHPC is to support the development of fishing plans that are **coordinated and integrated, to identify potential conflicts**, and to make recommendations for resolving disputes.

GUIDING PRINCIPLES:

- The following principles guide decisions on the structure and operations of the IHHPC:
- **Transparent, Accountable, Inclusive**
Representation, Effective, Efficient (details in notes)

Process:

The IHHPC Terms of Reference will be reviewed and revised as needed **once every three years**, or on a more frequent basis if required.

**Does this capture the purpose and intent
of the IHHPIC? What other aspects of the
purpose for the committee should be
added or clarified?**

IHHPC Terms of Reference – Organization and Membership

Membership (based on the current 2010 TOR), 2016 version

- 5 First Nations representatives, one for each major stock assessment area.
- Commercial Industry:
 - 5 spawn on kelp (SOK)
 - 10 Herring Industry Advisory Board (HIAB)
 - 1 Special Use Herring
- 1 Marine Conservation Caucus (MCC)
- 1 Sport Fishing Advisory Board (SFAB)
- 1 Province of BC (MAFF)
- 1 ex-officio DFO

IHHPC Terms of Reference – Organization and Membership

- In general, representatives in the IHHPC process should possess:
- Knowledge of policies related to management of Pacific herring;
- Knowledge of the elements of Herring harvest management, including: gear options and interactions, data management and potential allocation issues; and
- Level of scientific, technical, ecological or traditional expertise/knowledge that contributes to the discussion.

IHHPC Terms of Reference – Organization and Membership

- Each of the participating sectors, through their respective organizations, will nominate one alternate to represent their seat on the committee, as needed. In the interests of continuity, the Chair or facilitator of the IHHPC should be notified in advance of a meeting of any substitutions. Each organization/sector's representative will serve the term of three years. Should a vacancy arise before the completion of the three year term, the organization/sector will select a new representative as soon as possible.
- The following method will be used to appoint participants to the IHHPC process:
 - Participants (regular and alternate) nominated by their respective sectors/organization;
 - Nominations forwarded to the Department; and
 - Department nominees to committee (This is not an approval process).

IHHPC Terms of Reference – Organization and Membership

2010 version:

“First Nations participation on the IHHPC is intended to inform other users of the resource of the fishing plans and other intended activities of First Nations. DFO recognizes that some issues are best addressed in bilateral processes. The results of these bilateral processes may subsequently lead to improved effectiveness of multi-sectoral processes. With the complexity and large number of First Nations in each geographic area, it is understood that to represent all FSC interests fully would be difficult. The expectation is that First Nations representatives would possess a general perspective and understanding of FSC and harvest management issues in their areas”

2016 version does not have this section

- **Does this reflect an appropriate representation of sectors and interests related to Pacific Herring and Pacific Herring fisheries?**
- **What is an appropriate size for the Committee and how should adjustments to size and representation be made?**

IHHPC Terms of Reference - Process

2016 draft version

2010 version

- The IHHPC will meet at least two times annually (with additional meetings, as required) with meetings generally focused on the following: (details pre and post season meetings – in notes)
- The IHHPC was developed to support communication, dialogue and provide formal advice and recommendations to DFO on management and policy issues related to Pacific herring fisheries on a coastwide basis
- The IHHPC committee will meet two or three times per year (IHHPC will determine the frequency and length of meetings at first official meeting) (details pre and post season meetings)
- The IHHPC will be encouraged to develop recommendations based on consensus (also defines and talks more about consensus)

IHHPC Terms of Reference - Process

More detail in 2016 version:

- Promotes sustainable Pacific herring fisheries that both:
 - takes into account conservation and the importance of Pacific herring to the ecosystem and to other fisheries; and
 - supports an economically prosperous fishery for all participants
- Ensures the management of the Pacific herring fishery is informed by best available science and local and traditional knowledge; and
- Supports bi-lateral consultations between the Department and First Nations.

- **Does the above reflect participant's understanding of the IHHP process?**
- **What would improve the process and support committee members engaging with dialogue and advice?**
- **What other aspects of the process that should be amended, included or further clarified?**

IHHPC Terms of Reference – R&R

DFO:

- Determining agenda requirements for upcoming meeting(s);
- Clarifying the issues that the Department is seeking advice on
- Suggesting other avenues for providing advice on issues as required;
- Providing information, expertise and represent the public interest and policies of the Department;
- Ensuring that meeting notes are taken and provide a written record of proceedings, including attendance, issues discussed and any action items or recommendations that result;
- Distributing a meeting summary as detailed above for each meeting to participants.
- Providing feedback on how recommendations were considered
- Chairing the meetings and providing secretariat support.
- Organizing meetings and provide meeting space; and
- Distributing any material for discussion at scheduled meetings, including a draft agenda, with sufficient time in advance of the meeting to allow members to consult with constituents.

IHHPC Terms of Reference – R&R

Committee Members:

- Provide any feedback on the agenda to the Department five days prior to the meeting date;
- Review and meeting summaries and provide comments.
- Provide advice and information reflective of the views, knowledge and experience of their organizations/sectors;
- Communicate information to constituents;
- Willingness to contribute constructively to the discussion;
- Ability to represent the perspectives of their constituency;
- Capacity to work in an open and collaborative environment.

IHHPC Terms of Reference – R&R

Roles and Responsibilities (Chair/Facilitator) → 2010 version only

- Calls/convenes meetings
- Develops the agenda with input from members
- Coordinates attendance of participants
- Ensures that the committee charter is respected
- Encourages active participation of all members
- Mitigates conflict
- Helps to summarize and focus discussion
- Ensures that files/issues are being followed up on
- Ensures every meeting is productive

- **Are these roles and responsibilities appropriate for members of the IHHPCC?**
- **What other roles or responsibilities should be added, amended or clarified?**

Final Discussions

- Review action items
- Set next call and meeting dates



Herring Industry Advisory Board Meeting
9:00 – 4:00, November 8, 2017
Room 370, Wosk Centre, 580 W. Hastings, Vancouver

Meeting Objectives:

- Update on herring renewal.
- Review Draft Herring Science Advisory Report and Decision Tables for 2017/18
- Discuss Herring Expected Use.

Handouts:

- 2016/17 Herring Decision Tables from draft SAR.

Agenda

Time	Topic	Lead
0900 - 0910	Introduction	G. Thomas
0910 - 0915	Herring Best Practises	Ryan Ford
0915 - 0930	Vessel Discharge adjacent to Aquaculture sites	Amber Neuman
0930 - 1000	2017 Herring Renewal Update	Brenda Spence
1000 - 1030	Herring Stock Assessment Update for 2017/18	Jaclyn Cleary
1030 - 1200	Fishery Planning Discussion	HIAB/DFO
1200 - 1300	<i>LUNCH (provided)</i>	
1300 - 1545	HIAB Caucus <ul style="list-style-type: none">• F&B fishery plans• Roe fishery plans• Other	HIAB
1545 - 1600	Next Meeting	G. Thomas

Herring Expected Use, 2017/18 (short tons)

Model: AM1; 20% HR

Harvest Rate	Area	Forecast	Reference Point		TAC	Other Fisheries			F&B	Quota Remaining for Roe
			Fixed Cutoff	LRP (.3Bo)		FSC	SOK	Sp. Use		
20%	HG	8,032	11,770	9,840	0	150	0	0	0	0
20%	PRD	27,393	13,310	20,657	5,730	600	1,000	130	0	4,000
20%	CC	55,285	19,360	20,481	11,626	600	1,125	0	0	9,901
20%	SOG	186,901	23,320	53,477	39,672	35	0	902	4,000	34,735
20%	WCVI	38,375	20,680	25,380	8,265	150	105	0	0	8,010
	Total	315,986			65,294	1,535	2,230	1,032	4,000	56,647

Notes:

HG Forecast is below reference points so TAC is 0.

PRD - F&B Quota TBD

Model: AM1; 10% HR

Harvest Rate	Area	Forecast	Reference Point		TAC	Other Fisheries			F&B	Quota Remaining for Roe
			Fixed Cutoff	LRP (.3Bo)		FSC	SOK	Sp. Use		
10%	HG	8,032	11,770	9,840	0	150	0	0	0	0
10%	PRD	27,393	13,310	20,657	2,805	600	1,000	130	0	1,075
10%	CC	55,285	19,360	20,481	5,675	600	1,125	0	0	3,950
10%	SOG	186,901	23,320	53,477	19,285	35	0	902	4,000	14,348
10%	WCVI	38,375	20,680	25,380	3,978	150	105	0	0	3,723
	Total	315,986			31,743	1,535	2,230	1,032	4,000	23,096

Notes:

HG Forecast < Reference Points so TAC is 0.

PRD - F&B Quota TBD.

Model: AM2; 20% HR

Harvest Rate	Area	Forecast	Reference Point		TAC	Other Fisheries			F&B	Quota Remaining for Roe
			Fixed Cutoff	LRP (.3Bo)		FSC	SOK	Sp. Use		
20%	HG	4,781	11,770	7,622	0	150	0	0	0	0
20%	PRD	26,316	13,310	20,162	5,510	600	1,000	130	0	3,780
20%	CC	35,704	19,360	18,264	7,494	600	1,125	0	0	5,769
20%	SOG	137,814	23,320	45,802	28,872	35	0	902	4,000	23,935
20%	WCVI	22,003	20,680	15,474	4,739	150	105	0	0	4,484
	Total	226,618			46,615	1,535	2,230	1,032	4,000	37,968

Notes:

HG Forecast is below reference points so TAC is 0.

PRD - F&B Quota TBD.

WCVI - The TAC at 20% HR would take the abundance below the Fixed Cutoff, so the TAC could be reduced to 1,323 Tons leaving 1,068 Tons for roe.

Model: AM2; 10% HR

Harvest Rate	Area	Forecast	Reference Point		TAC	Other Fisheries			F&B	Quota Remaining for Roe
			Fixed Cutoff	LRP (.3Bo)		FSC	SOK	Sp. Use		
10%	HG	4,781	11,770	7,622	0	150	0	0	0	0
10%	PRD	26,316	13,310	20,162	2,689	600	1,000	130	0	959
10%	CC	35,704	19,360	18,264	3,659	600	1,125	0	0	1,934
10%	SOG	137,814	23,320	45,802	14,106	35	0	902	4,000	9,169
10%	WCVI	22,003	20,680	15,474	2,287	150	105	0	0	2,032
	Total	226,618			22,740	1,535	2,230	1,032	4,000	14,093

Notes:

HG Forecast is below reference points so TAC is 0.

PRD - F&B Quota TBD.

WCVI - The TAC at 10% HR would take the abundance below the Fixed Cutoff, so the TAC could be reduced to 1,323 Tons leaving 1,068 Tons for roe.



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Ecosystems and
Oceans Science

Sciences des écosystèmes
et des océans

**DRAFT- Canadian Science Advisory Secretariat
Science Advisory Report 2017/nnn**

Pacific Region

Stock assessment for Pacific Herring (*Clupea pallasii*) in British Columbia in 2017 and forecast for 2018



Pacific Herring (Clupea pallasii). Image credit: Fisheries and Oceans Canada.

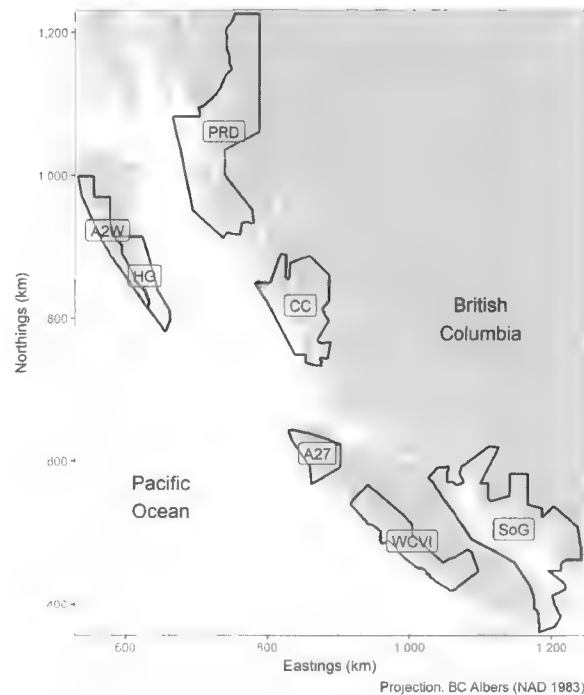


Figure 1. Boundaries for the Pacific Herring stock assessment regions (SARs) in B.C., Canada. The major SARs are Haida Gwaii (HG), Prince Rupert District (PRD), Central Coast (CC), Strait of Georgia (SoG), and West Coast of Vancouver Island (WCVI). The minor SARs are Area 27 (A27) and Area 2 West (A2W). Units: kilometres (km).

Context:

Pacific Herring (Clupea pallasii) is a pelagic species inhabiting inshore and offshore waters of the North Pacific. In the eastern Pacific, herring distribution ranges from California to the Beaufort Sea. Herring annually migrate between feeding and spawning areas. Fish mature and recruit to the spawning stock primarily between ages-2 and 5. In British Columbia (BC), herring predominantly recruit at age-3. BC herring stocks are managed based on five major and two minor stock areas. The five major BC herring stocks are Haida Gwaii, Prince Rupert District, Central Coast, Strait of Georgia, and West Coast of Vancouver Island, while the two minor herring stocks are Area 2W and Area 27 (Figure 1). Catch and survey information is collected independently for each of these seven areas and science advice is provided on the same scale.

Fisheries Management Branch annually requests science advice regarding the status of herring stocks in BC and harvest options following the current harvest control rule and using decision tables. New to the 2017 assessment is estimation of stock productivity, and estimation of current stock status relative to the limit reference point of $0.30SB_0$, reviewed and approved in early 2017 (DFO 2017). Finally, DFO

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Pacific Region is also engaged in a concurrent multi-year process to renew the management framework for Pacific Herring, which includes simulation evaluation of harvest control rules.

This Science Advisory Report is from the October 17-18, 2017 Stock Assessment and Management Advice for BC Pacific Herring: 2017 Status and 2018 Forecast. Additional publications from this meeting will be posted on the Fisheries and Oceans Canada Science Advisory Schedule as they become available.

SUMMARY

- Commercial fishing for British Columbia (BC) Pacific Herring is managed in five major stock management areas: Haida Gwaii (HG), Prince Rupert District (PRD), Central Coast (CC), Strait of Georgia (SOG), and West Coast of Vancouver Island (WCVI), as well as two minor stock areas: Haida Gwaii Area 2W, and WCVI Area 27.
- Spawning biomass in 2017 (SB_{2017}) and pre-fishery forecast spawning biomass for 2018 (SB_{2018}) were assessed. Two base cases were implemented: AM2 and AM1, differing in the treatment of spawn survey scaling coefficients (q_1 , q_2).
- Advice for each Pacific Herring stock is presented in decision tables showing predicted status in 2018 given a range of constant catches relative to the limit reference point (LRP) of $0.30SB_0$, the commercial fishery cut-offs (AM2 only), and target harvest rates of 10% and 20%.
- A new version of the assessment model (ISCAM) was implemented, with the same parameter settings that were used in the 2016 assessment.
- Sensitivity analyses were conducted to investigate uncertainty in the assumptions that were used to estimate the following parameters: natural mortality, variance parameters, survey catchability parameters, and maturity at age.
- Resolution between the performance of the AM2 and AM1 parameterizations of q will require a simulation-evaluation analysis. Further details on the analytical concerns with both AM2 and AM1 parameterizations of q can be found in Table A.1 of the 2016 Science Response (DFO 2016).
- The 2017 assessment includes estimation of stock productivity, and estimation of current stock status relative to the limit reference point (LRP) of $0.30SB_0$.
- All five major stocks show declines in weight-at-age from the mid-1980s to 2010, with a leveling off and/or increase in the last five years.
- Potential impacts from the spawn on kelp fishery (SOK) (e.g., mortality, removed spawn) have not yet been formally accounted for in annual stock assessments.
- Other sources of uncertainty include structural assumptions about natural mortality, and uncertainty about the effects of fish movement and stock structure. For two stock areas (HG, WCVI), small sample sizes of age-composition samples in recent years are also a concern.

INTRODUCTION

Pacific Herring (*Clupea pallasii*) is a pelagic species migrating between inshore spawning and offshore feeding areas of the North Pacific Ocean. Herring distribution in the eastern Pacific Ocean ranges from California to the Beaufort Sea. Pacific Herring mature and recruit to the spawning stock predominantly at age-3 within British Columbia (BC).

Pacific Herring in BC are divided into five major and two minor stocks for evaluation and management (Figure 1). This stock structure is supported in part by the results of multi-year tagging and genetic studies (Hourston 1982, Beacham et al. 2008, Flostrand et al. 2009). The major stocks are: Haida Gwaii (HG), Prince Rupert District (PRD), Central Coast (CC), Strait of Georgia (SOG) and West Coast of Vancouver Island (WCVI). The two minor herring stocks are Area 2W (on the west coast of Haida Gwaii) and Area 27 (on the west coast of Vancouver Island, centered on Quatsino Sound).

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Pacific Herring in BC have been harvested for many years to provide a variety of food products. First Nations have traditionally harvested whole herring and herring spawn-on-kelp for food, social and ceremonial purposes. Pacific Herring were commercially harvested and processed (reduced) into relatively low-value products such as fishmeal and oil from the early 1930s through the late 1960s. Commercial catches increased dramatically in the early 1960s, but were unsustainable. By 1965, most of the older fish had been removed from the spawning population by overfishing and sequential weak year-classes, attributed to a combination of unfavourable environmental conditions and low spawning biomass. The commercial fishery collapsed and was closed by the federal government in 1967. During the closure period limited fishing activity occurred at low levels from 1967-1971 (Hourston 1980). Growing interest in harvesting roe herring for export to Japan resulted in a small experimental roe harvest, beginning in 1971. The roe fishery expanded rapidly until 1983, when a fixed harvest rate was introduced to regulate catch. A series of above average year-classes in the early 1970s led to rapid rebuilding of Pacific stocks and the re-opening of areas for commercial fishing.

At present, the Pacific Herring fisheries in BC consists of: commercial fishing opportunities for food and bait herring, spawn-on-kelp (SOK) products, and roe herring. There are also opportunities for First Nations food, social, and ceremonial fisheries (FSC), and recreational fishing. Time series of commercial catch, excluding spawn-on-kelp, from 1951-2017 are presented for the five major stocks in Figure 2.

Both fishery dependent and fishery independent time series of data are used in the assessment of Pacific Herring stocks. Fishery-dependent data include validated catch and biological samples from commercial fisheries. Fishery-independent data include biological samples from the test fishery program, and a herring egg deposition survey (also called the spawn survey), which is used to estimate a relative index of spawner biomass.

ASSESSMENT

Stock Assessment Modeling for 2017

For the 2017 assessment, an updated version of the ISCAM (Integrated Statistical Catch-Age Model; Martell et al. 2012) was applied to assess each of the five Pacific Herring stocks. This catch-at-age model was applied independently to each stock area and tuned to fishery-independent spawn index data, annual estimates of commercial catch since 1951, and age composition data from the commercial fishery and the test fishery charter program. The key results from stock assessments of Pacific Herring in the five major stock areas are summarized as stock reconstructions, status of spawning stock in 2017 relative to the LRP of $0.30SB_0$, and projected spawning biomass in 2018.

A bridging analysis was used to validate the updated ISCAM model.

ISCAM estimates stock-recruitment parameters (recruitment is modelled as age-2 fish, while recruitment to the spawning biomass occurs at age-3), time-varying natural mortality, spawn survey scaling parameters for the survey time series (q_1 , q_2), and selectivity parameters for three main commercial fisheries, generating time series estimates of spawning biomass and unfished biomass. One-year projections for 2018 were performed for each major stock area, over a range of constant catches, to estimate the predicted status in 2018 relative to the limit reference point (LRP) of $0.30SB_0$, the commercial fishery cut-offs (AM2 only), and target harvest rates of 10% and 20%.

The 2017 assessment implemented the AM2 and AM1 base stock assessment models that have been used since 2011 (DFO, 2016). AM2 and AM1 differ in the treatment of spawn survey

scaling parameters (q_1 and q_2) for the surface survey period (1951 to 1987) and dive survey period (1988 to 2017).

Neither the bridging analysis nor the sensitivity analyses were able to definitively support either one of the base case models over the other. Therefore we support the continued use of these two base case models for each of the five major herring stocks. Sensitivity analyses alone are insufficient for understanding the complex interplay between q_2 and management parameters. Resolution between the AM2 and AM1 parameterization of q_2 , in terms of performance, will require simulation-evaluation.

Advice to managers is presented in Figure 2 through Figure 11, which shows: estimated (current) spawning biomass (SB_{2017}); estimated unfished equilibrium spawning biomass (SB_0); stock status relative to the unfished biomass (SB_{2017}/SB_0); stock status relative to the LRP of $0.30SB_0$; trends in estimated age-2 recruitment; and trends in estimated instantaneous natural mortality. Summaries of some of these values are provided in Table 1 to 5. Probabilistic decision tables provide additional information under a range of potential Total Allowable Catch (TAC) values (Table 6 to Table 15). Projected spawning biomass assuming no fishing in 2018, SB_{2018} is presented in Figure 12.

Analysis

HAIDA GWAI (HG)

Data

Haida Gwaii was closed to commercial roe fisheries from 2002–2013 and 2015–2017, and to commercial SOK fisheries from 2004–2013 and 2015–2017. Commercial roe and SOK fishing opportunities were available in 2014, however they were not pursued following an agreement between the commercial sector and local First Nations.

The spawn index decreased from 6,888 t in 2016 to 3,016 t in 2017. Biological samples (seine caught) in 2017 contained 14% age-2 fish, 32% age-3 fish, and 54% age-4 and older.

Stock productivity and recruitment

Both AM2 and AM1 estimated a declining trend in spawning stock biomass since 2013. The spawning biomass has remained low in most years since 2000, including 2017. In most years since 2000, including the most recent estimate for 2016, the HG stock has been in a low productivity, low biomass state, indicating negative stock growth.

Age-2 recruitment in 2017 is low, as expected given the current low biomass state. Although model estimates of natural mortality remain highly uncertain, there is an increasing trend in the median estimates of natural mortality since 2012.

Estimated stock status and status relative to biological reference points

AM2 estimates the median spawning biomass in 2017, SB_{2017} , at 3,963 t (equal to 17% of SB_0). AM1 estimates the median SB_{2017} at 7,336 t (25% of SB_0). Based on a comparison of median estimates, both AM2 and AM1 models estimate SB_{2017} to be below the LRP of $0.3SB_0$ with greater than a 50% probability.

Projected spawning biomass in 2018 and spawning biomass related to HCR metrics

There is very little estimated age-2 recruitment entering the population in 2017, indicating low predicted age-3 fish in the spawning population in 2018. The projected pre-fishery spawning

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biomass in 2018, SB_{2018} , is 4,346 t (AM2; median) or 7,302 t (AM1), similar to SB_{2017} levels, consisting of 34% (median; AM2) age-3 fish and 38% age-4 and older fish (median, AM2).

In 2018, there is an 81% (AM2) and 65% (AM1) probability the stock will be below the LRP of $0.3SB_0$ in the absence of fishing. Under AM2, the projected pre-fishery spawning biomass in 2018, SB_{2018} , has a 94% chance of being below the 1996 fixed cutoff (10,700 t).

PRINCE RUPERT DISTRICT (PRD)

Data

The combined total validated catch for the seine roe, the gillnet roe, and the food and bait fisheries was 2,849 t for the 2016/17 herring season. Commercial spawn-on-kelp operations also occurred in 2017.

The spawn index increased from 18,985 t in 2016 to 19,235 t in 2017. Biological samples (seine-caught) in 2017 contained ~1% age-2 fish, 16% age-3 fish, and 83% age-4 and older.

Stock productivity and recruitment

Since the mid-1990s, the PRD stock has been characterized by two periods of consistent and stable spawning biomass: 1996-2003 and 2006-2017. From 2005 onward, including the most recent estimate for 2016, spawning biomass production for the PRD stock has been positive, indicating stock growth.

Both AM2 and AM1 estimate a large recruitment of age-2 fish to the population in 2014, relative to the last 10 years, owing largely to the age composition data showing a high proportion of samples consisting of age-2 fish. The 2017 age-2 recruits are estimated to be around the average. Although model estimates of natural mortality remain highly uncertain, there is a decreasing trend in the median estimates of natural mortality since 2006.

Estimated stock status and status relative to biological reference points

AM2 estimates the median spawning biomass in 2017, SB_{2017} , at 21,738 t (equal to 34% of SB_0). AM1 estimates the median SB_{2017} at 22,821 t (36% of SB_0). Based on a comparison of median estimates, both AM2 and AM1 models estimate SB_{2017} to be above the LRP of $0.3SB_0$ with greater than a 50% probability and less than a 95% probability.

Projected spawning biomass in 2018 and spawning biomass related to HCR

Both AM2 and AM1 predict a continued stable trend in spawning biomass, with projected pre-fishery spawning biomass in 2018, SB_{2018} , of 23,924 t (AM2; median) and 24,903 t (AM1), consisting of 23% (median, AM2) age-3 fish and 68% age-4 and older fish (AM2).

In 2018, there is a 27% (AM2) and 26% (AM1) probability the stock will be below the LRP of $0.3SB_0$ in the absence of fishing. Under AM2, the projected pre-fishery spawning biomass in 2018, SB_{2018} , has a 3% chance of being below the 1996 fixed cutoff (12,100 t).

CENTRAL COAST (CC)

Data

There were no commercial roe fisheries in 2017. Spawn-on-kelp operations occurred in all statistical areas in 2017.

The spawn index decreased from 32,508 t in 2016 to 23,517 t in 2017. Biological samples (seine-caught) in 2017 contained 3% age-2 fish, 17% age-3 fish, and 80% age-4 and older.

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Stock productivity and recruitment

The AM2 and AM1 base case assessments estimate an increasing trend in spawning stock biomass since 2012, including 2017. From 2012 onward, including the most recent estimate for 2016, spawning biomass production for the CC stock has been positive, indicating stock growth.

The 2017 age-2 recruits were estimated to be average-to-below-average. Age-5 fish were estimated to comprise the highest proportion of fish, arising from the 2012 cohort. Although model estimates of natural mortality remain highly uncertain, there is a decreasing trend in the median estimates of natural mortality since 2008.

Estimated stock status and status relative to biological reference points

AM2 estimates the median spawning biomass in 2017, SB_{2017} , at 30,474 t (equal to 55% of SB_0). AM1 estimates the median SB_{2017} at 49,624 t (80% of SB_0). Based on a comparison of median estimates, both AM2 and AM1 models estimate SB_{2017} to be above the LRP of $0.3SB_0$ with greater than a 95% probability.

Projected spawning biomass in 2018 and spawning biomass related to HCR

The projected pre-fishery spawning biomass in 2018, SB_{2018} , is 32,458 t (median; AM2) or 50,259 t (AM1), similar to SB_{2017} levels, consisting of 25% (median; AM2) age-3 fish and 66% age-4 and older fish (AM2).

In 2018, there is a 3% (AM2; median) and 1% (AM1) probability the stock will be below the LRP of $0.3SB_0$ in the absence of fishing. Under AM2, the projected pre-fishery spawning biomass in 2018, SB_{2018} , has a 5% chance of being below the 1996 fixed cutoff (17,600 t).

STRAIT OF GEORGIA (SOG)

Data

The combined total validated catch for the seine roe, the gillnet roe, and the food and bait and special use fisheries was 25,279 t for the 2016/17 herring season. This was the largest removal in the roe herring fishery era.

The spawn index decreased from 129,502 t in 2016 to 81,064 t in 2017. Biological samples (seine-caught) in 2017 contained relatively even proportions of age-3 (28%), age-4 (29%), and age-5 (23%) fish.

Stock productivity and recruitment

Both AM2 and AM1 base case assessment models estimate an increasing trend in spawning stock biomass since 2010. From 2008 onward, including the most recent estimate for 2016, spawning biomass production for the SOG stock has been positive, indicating stock growth.

Both models estimate an above-average number of age-2 recruits in 2017. Age-3 and -4 fish comprise the highest estimated proportion of fish, which is consistent with the previous 5 years.

Model estimates of natural mortality remain highly uncertain in the most recent years. AM2 estimates a decreasing trend in the median estimates of natural mortality since 2008, and AM1 estimates an increasing trend in the median estimates of natural mortality since 2015.

Estimated stock status and status relative to biological reference points

AM2 estimates the median spawning biomass in 2017 (SB_{2017}) at 114,626 t (equal to 81% of SB_0). AM1 estimates the median SB_{2017} at 175,962 t (108% of SB_0). Based on a comparison of

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median estimates, both AM2 and AM1 models estimate SB_{2017} to be above the LRP of $0.3SB_0$ by greater than 95% probability.

Projected spawning biomass in 2018 and spawning biomass related to HCR

The projected pre-fishery spawning biomass in 2018, SB_{2018} , is 125,285 t (median; AM2) or 169,910 t (AM1), declining from 2017, consisting of 25% (median; AM2) age-3 fish and 67% age-4 and older fish (AM2).

In 2018, under both AM2 and AM1, there is a 0% probability the stock will be below the LRP of $0.3SB_0$ in the absence of fishing. Under AM2, the projected pre-fishery spawning biomass in 2018, SB_{2018} has a 0% chance of being below the 1996 fixed cutoff (21,200 t).

WEST COAST OF VANCOUVER ISLAND (WCVI)

Data

This area was closed to commercial fisheries since 2006, with SOK permitted in 2011.

The spawn index decreased from 20,528 t in 2016 to 15,734 t in 2017. Biological samples (seine-caught) contained a high proportion of age-4 fish (66%), with 3% age-2 and 8% age-3 fish.

Stock productivity and recruitment

AM2 and AM1 base case assessments estimate a decline in spawning stock biomass from 2016 to 2017. In most years since 2005, including the most recent estimate for 2016, the WCVI stock has been in a prolonged low productivity, low biomass state, indicating negative stock growth. At these low biomass levels, the WCVI stock is characterized by seemingly abrupt differences in year-to-year survey biomass.

The number of age-2 recruits estimated is below-average and there was a higher proportion of age-4 fish relative to age-2 and -3 fish. Although model estimates of natural mortality remain highly uncertain, there is an increasing trend in the median estimates of natural mortality since 2014.

Estimated stock status and status relative to biological reference points

AM2 estimates the median spawning biomass in 2017, SB_{2017} , at 17,742 t (equal to 37% of SB_0). AM1 estimates the median SB_{2017} at 32,805 t (56% of SB_0). Based on a comparison of median estimates, both AM2 and AM1 models estimate SB_{2017} to be above the LRP of $0.3SB_0$, by greater than 50% probability but less than 95% probability.

Projected spawning biomass in 2018 and spawning biomass related to HCR

There is very little estimated age-2 recruitment entering the spawning population in 2017 indicating low predicted age-3 recruitment in 2018. The projected pre-fishery spawning biomass in 2018, SB_{2018} , is 20,003 t (AM2; median) or 34,886 t (AM1), similar to SB_{2017} levels, consisting of 32% (median; AM2) age-3 fish and 48% age-4 and older fish (AM2).

In 2018, there is a 20% (AM2) and 5% (AM1) probability the stock will be below the LRP of $0.3SB_0$ in the absence of fishing. Under AM2, the projected pre-fishery spawning biomass in 2018, SB_{2018} has a 45% chance of being below the 1996 fixed cutoff (18,800 t).

MINOR STOCKS

- Stock assessments were not done for the two Pacific Herring minor stock areas.

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- A commercial spawn-on-kelp fishery last occurred in Area 2W in 2014 and the last commercial roe herring fishery occurred in 1998. Herring spawn was not surveyed in Area 2W in 2015 or 2017. The spawn index was 3,001 t in 2016.
- A commercial spawn-on-kelp fishery last occurred Area 27 in 2014 and the last commercial roe herring fishery was in 1994. Herring spawn was incompletely surveyed in Area 27 2017, with a survey index of 26 t. The spawn index was 814 t in 2016.

Reference Points

The 2017 assessment includes: an updated production analysis (Figure 2 Figures 2 to 11, panels e and f); estimation of current stock status relative to the LRP of $0.30SB_0$; and the probability of the projected stock status (SB_{2018}) being below the LRP, which is presented in the decision tables (Table 6 Table 6 to Table 15 15). To mitigate short-term consequences to resource users, Kronlund et al. (2017) recommend the phasing-in of any new management procedure designed to avoid LRPs and achieve targets (i.e., changes to data collection, stock assessment models and/or harvest control rules). Application of the LRP for annual decision-making is part of on-going discussions with Fisheries Management. Candidate Upper Stock References (USR) are also presented. A fully specified set of objectives that includes LRPs, USRs and target reference points (TRPs) will be necessary to meet goals for renewal of the Pacific Herring management system and consistency with the DFO PA Framework (DFO 2009).

Ecosystem and Forage Fish Considerations

Pacific Herring play a key role in marine ecosystems and are a food source for a variety of piscivorous species including Pacific Salmon (Coho – *Oncorhynchus kisutch*, and Chinook, *O. tshawytscha*), Pacific Hake (*Merluccius productus*), Halibut (*Hippoglossus stenolepis*), Arrowtooth Flounder (*Atheresthes stomias*), and Dogfish Shark (*Squalus acanthias*) (Schweigert et al. 2010). Pacific Herring are also believed to be important in the diet of many marine mammal predators. During the time-period captured in the Pacific Herring assessment (1951-2017), population sizes of seals, sea lions and baleen whales, which forage on herring, have increased (DFO 2003; DFO 2010; Carretta et al. 2011; Crawford and Irvine 2011).

Researchers continue to develop a greater understanding of ecosystem processes and the role that herring play in the ecosystem. The need for a multi-species definition for serious harm for forage fish is considered in both international and domestic policies. Ecosystem-wide analyses of alternative harvest policies for the management of forage fish have been presented in recent literature (e.g., Pikitch et al. 2012). However, these harvest policies and implied reference points have not been applied in practice and it is therefore not possible to establish best practices based on precedent. Future research to support adjustment of biological reference points for BC Pacific Herring based on ecosystem considerations will require review of empirical data, meta-analyses and simulation model studies.

Sources of Uncertainty

Recruitment and natural mortality are considered to be the most important processes determining the productivity of BC Pacific Herring stocks. Factors driving age-3 recruitment to the spawning biomass, forecasted by the assessment model, are not fully understood. Instantaneous natural mortality (M) is estimated to be increasing for HG, decreasing for PRD and CC, and possibly increasing for SOG and WCVI stocks. The reasons for these changes are not clear at present, but are under investigation. Natural mortality is an important parameter in the stock assessment model because it affects current stock biomass and also the estimate of the unfished biomass. Long term declines in body size (weight at age) have been observed for

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all BC herring stocks from the early 1980s-2010, with a levelling off and/or increase at the low end of the range in most recent years. Factors causing these changes are not understood.

The current assessment framework presents BC herring as five discrete homogeneous stocks and does not consider between-stock movement or uncertainty in stock structure. Mechanisms to characterize reference points for Pacific Herring stock that allow for spatial distribution, stock structure, and genetic diversity are not well understood. Future development of population dynamics models that include spatial dynamics and/or stock structure may lead to candidate LRPs and performance indicators that characterize broader definitions of serious harm. Spatial operating models could also inform management options at finer spatial scales than the current major management areas.

Fishery removals are presented and included for roe herring and whole herring fisheries only. Removals associated with spawn-on-kelp fisheries are not currently included in the annual stock assessment process.

Modelling results reflect only the structural assumptions specified in the model and weights assigned to the various data components. This represents a minimum estimate of uncertainty. While uncertainty in estimated parameters and derived quantities is explicitly addressed using a Bayesian approach, alternative model and stock structure assumptions - including alternative forecasting methods - would illustrate greater levels of uncertainty. Finally, for some stock areas in recent years (HG, WCVI), small sample sizes of age-composition samples are a concern.

CONCLUSIONS AND ADVICE

Decision tables for 2018 are presented for AM2 and AM1 base case model runs for the five major stock areas: HG, PRD, CC, SOG, and WCVI (~~Table 6~~ to ~~Table 15~~).

Below is an example of how to read the tables for PRD:

Under the assumptions of AM2 for PRD (~~Table 8~~, row 9), given a 2018 catch of 5,000 t, the estimated probability that the harvest rate (U) exceeds the 20% target rate is 0.503 (50%), and the probability that $SB_{2018} < \text{fixed cut-off (12,100 t)}$ is estimated to be 0.144 (14%). At this harvest level, the estimated probability that $SB_{2018} < \text{LRP}$ is 0.451 (45%).

Note that fixed cutoffs and the 20% harvest rate are from the existing herring harvest control rule (HCR). The LRP for Pacific Herring stocks was introduced in early 2017. Because the LRP is new, and because updated simulation-testing of HCRs for herring is not yet complete, there are two areas where the fishery cutoff established in 1996 is below the LRP (PRD and SOG).

Recommendations for future work follow:

- Simulation-testing of management procedures (for all fisheries, including SOK).
- Quantify mortality and removals (eggs) associated with the spawn-on-kelp fishery.
- Quantify uncertainty in the spawn index (annual estimates of variance and biases).
- Investigate potential for stock-specific prior distribution on q_2 , and ways to incorporate year-to-year variability in q_2 .
- Update stock-specific maturity ogives.
- Investigate alternative patterns of time varying natural mortality.

OTHER CONSIDERATIONS

Simulation analyses of performance of alternative HCRs will occur within a Management Strategy Evaluation (MSE) process, focusing on establishing Management Procedures compliant with the DMF policy, including avoiding Limit Reference Points (LRP) with high probability and establishing Upper Stock Reference (USR) points or target biomass levels.

SOURCES OF INFORMATION

This Science Advisory Report is from the October 17 & 18, 2017 'Stock assessment and management advice for BC Pacific Herring: 2017 status and 2018 forecast'. Additional publications from this meeting will be posted on the Fisheries and Oceans Canada (DFO) Science Advisory Schedule as they become available.

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APPENDIX

Tables

Table 1. Posterior (5th percentile, median, and 95th percentile) of proposed reference points for the Haida Gwaii models. Biomass numbers are in thousands of tonnes. Legend: SB_0 is unfished spawning biomass, SB_{2017} is estimated spawning biomass in 2017, SB_{2018} is predicted spawning biomass assuming no fishing in 2018, proportion aged 3 is the predicted proportion of age-3 fish assuming no fishing in 2018, and proportion aged 4-10 is the predicted proportion of age-4 fish and older assuming no fishing in 2018.

Reference point	AM2			AM1		
	5%	50%	95%	5%	50%	95%
SB_0	18.319	23.098	30.163	22.781	29.818	40.026
$0.3SB_0$	5.496	6.929	9.049	6.834	8.945	12.008
SB_{2017}	1.980	3.963	8.005	3.434	7.336	15.433
SB_{2017}/SB_0	0.083	0.171	0.347	0.118	0.246	0.495
SB_{2018}	1.900	4.346	11.326	3.044	7.302	18.483
Proportion aged 3	0.09	0.34	0.70	0.09	0.31	0.67
Proportion aged 4-10	0.15	0.38	0.68	0.17	0.42	0.71

Table 2. Posterior (5th percentile, median, and 95th percentile) of proposed reference points for the Prince Rupert District models. See Table 1 for description.

Reference point	AM2			AM1		
	5%	50%	95%	5%	50%	95%
SB_0	46.919	61.097	92.122	47.786	62.595	91.271
$0.3SB_0$	14.076	18.329	27.637	14.336	18.779	27.381
SB_{2017}	12.656	21.738	36.537	12.213	22.821	41.708
SB_{2017}/SB_0	0.193	0.344	0.595	0.182	0.358	0.669
SB_{2018}	12.893	23.924	44.818	12.606	24.903	50.081
Proportion aged 3	0.07	0.23	0.55	0.07	0.24	0.54
Proportion aged 4-10	0.39	0.68	0.87	0.39	0.68	0.87

Table 3. Posterior (5th percentile, median, and 95th percentile) of proposed reference points for the Central Coast models. See Table 1 for description.

Reference point	AM2			AM1		
	5%	50%	95%	5%	50%	95%
SB_0	44.424	55.347	71.220	49.235	62.063	81.175
$0.3SB_0$	13.327	16.604	21.366	14.770	18.619	24.352
SB_{2017}	18.518	30.474	47.125	27.553	49.624	85.709
SB_{2017}/SB_0	0.328	0.545	0.898	0.449	0.801	1.324
SB_{2018}	17.728	32.458	60.684	25.958	50.259	96.481
Proportion aged 3	0.07	0.25	0.56	0.07	0.22	0.52
Proportion aged 4-10	0.38	0.66	0.85	0.42	0.69	0.87

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Table 4. Posterior (5th percentile, median, and 95th percentile) of proposed reference points for the Strait of Georgia models. See ~~Table 1~~Table 1 for description.

Reference point	AM2			AM1		
	5%	50%	95%	5%	50%	95%
SB_0	110.088	138.795	199.081	126.823	162.050	229.336
$0.3SB_0$	33.026	41.638	59.724	38.047	48.615	68.801
SB_{2017}	70.478	114.626	176.690	102.598	175.962	304.613
SB_{2017}/SB_0	0.464	0.813	1.313	0.610	1.078	1.796
SB_{2018}	71.847	125.285	216.387	92.908	169.910	323.468
Proportion aged 3	0.09	0.25	0.51	0.10	0.26	0.52
Proportion aged 4-10	0.42	0.67	0.85	0.40	0.64	0.82

Table 5. Posterior (5th percentile, median, and 95th percentile) of proposed reference points for the West Coast of Vancouver Island models. See ~~Table 1~~Table 1 for description.

Reference point	AM2			AM1		
	5%	50%	95%	5%	50%	95%
SB_0	37.870	46.890	61.469	45.961	58.491	76.910
$0.3SB_0$	11.361	14.067	18.441	13.788	17.547	23.073
SB_{2017}	9.719	17.742	30.650	16.877	32.805	62.881
SB_{2017}/SB_0	0.201	0.373	0.654	0.297	0.559	1.021
SB_{2018}	10.183	20.003	41.001	16.914	34.886	73.564
Proportion aged 3	0.11	0.32	0.63	0.11	0.31	0.60
Proportion aged 4-10	0.24	0.48	0.72	0.27	0.51	0.74



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Table 6. Probabilistic decision table for Haida Gwaii, AM2 model. Legend: TAC is total allowable catch, P indicates the probability, SB_0 is unfinished spawning biomass, SB_{2018} is predicted spawning biomass assuming the specified TAC in 2018, Med indicates the median, and U_{2018} is the predicted harvest rate given the specified TAC in 2018.

2018 TAC (metric tonnes)	$P(SB_{2018} < 0.3SB_0)$	Med($SB_{2018}/0.3SB_0$)	$P(SB_{2018} < 10,700)$	Med($SB_{2018} < 10,700$)	$P(U_{2018} < 20\%)$	$P(U_{2018} > 10\%)$	Med(U_{2018})
0	0.808	0.630	0.938	0.406	0.000	0.000	0.000
400	0.821	0.598	0.943	0.387	0.041	0.399	0.088
457	0.824	0.593	0.944	0.384	0.068	0.501	0.100
500	0.825	0.589	0.944	0.382	0.096	0.570	0.109
600	0.829	0.581	0.945	0.377	0.177	0.697	0.129
770	0.835	0.569	0.946	0.369	0.332	0.829	0.163
800	0.836	0.566	0.946	0.368	0.359	0.847	0.169
965	0.842	0.553	0.948	0.360	0.501	0.905	0.200
1,000	0.843	0.550	0.948	0.358	0.529	0.915	0.207
1,500	0.857	0.515	0.952	0.335	0.791	0.978	0.295
1,620	0.860	0.508	0.953	0.329	0.830	0.982	0.315
1,700	0.862	0.502	0.954	0.325	0.851	0.986	0.328

Table 7. Probabilistic decision table for Haida Gwaii, AM1 model. See Table 6 Table-6 for description.

2018 TAC (metric tonnes)	$P(SB_{2018} < 0.3SB_0)$	Med($SB_{2018}/0.3SB_0$)	$P(U_{2018} < 20\%)$	$P(U_{2018} > 10\%)$	Med(U_{2018})
0	0.654	0.808	0.000	0.000	0.000
400	0.669	0.785	0.002	0.116	0.053
457	0.671	0.781	0.006	0.170	0.061
500	0.673	0.778	0.013	0.212	0.066
600	0.676	0.772	0.032	0.324	0.079
770	0.682	0.762	0.086	0.504	0.101
800	0.684	0.760	0.096	0.537	0.104
965	0.689	0.749	0.170	0.660	0.125
1,000	0.690	0.748	0.184	0.683	0.129
1,500	0.710	0.718	0.446	0.878	0.188
1,620	0.715	0.711	0.504	0.908	0.201
1,700	0.718	0.706	0.542	0.920	0.210

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Table 8. Probabilistic decision table for Prince Rupert District, AM2 model. See Table 6 for description.

2018 TAC (metric tonnes)	$P(SB_{2018} < 0.3SB_0)$	$Med(SB_{2018} / 0.3SB_0)$	$P(SB_{2018} < 10,700)$	$Med(SB_{2018} < 10,700)$	$P(U_{2018} < 20\%)$	$P(U_{2018} > 10\%)$	$Med(U_{2018})$
0	0.265	1.271	0.034	1.977	0.000	0.000	0.000
2,400	0.361	1.169	0.077	1.817	0.025	0.483	0.098
2,440	0.362	1.167	0.077	1.814	0.027	0.500	0.100
2,545	0.367	1.163	0.079	1.808	0.034	0.548	0.104
3,000	0.382	1.144	0.090	1.778	0.087	0.705	0.122
3,500	0.400	1.122	0.103	1.745	0.171	0.822	0.142
4,000	0.419	1.099	0.116	1.711	0.277	0.902	0.162
4,500	0.436	1.078	0.130	1.678	0.385	0.946	0.181
5,000	0.451	1.057	0.144	1.646	0.503	0.970	0.201
5,200	0.460	1.049	0.147	1.633	0.546	0.977	0.208
5,500	0.469	1.037	0.156	1.613	0.605	0.983	0.220
6,000	0.485	1.016	0.168	1.580	0.687	0.989	0.239
7,000	0.522	0.976	0.198	1.517	0.807	0.995	0.276

Table 9. Probabilistic decision table for Prince Rupert District, AM1 model. See Table 6 for description.

2018 TAC (metric tonnes)	$P(SB_{2018} < 0.3SB_0)$	$Med(SB_{2018} / 0.3SB_0)$	$P(U_{2018} < 20\%)$	$P(U_{2018} > 10\%)$	$Med(U_{2018})$
0	0.264	1.311	0.000	0.000	0.000
2,400	0.339	1.208	0.029	0.443	0.095
2,440	0.340	1.206	0.033	0.459	0.096
2,545	0.343	1.202	0.041	0.502	0.100
3,000	0.356	1.184	0.094	0.651	0.118
3,500	0.374	1.163	0.168	0.778	0.137
4,000	0.392	1.143	0.258	0.858	0.155
4,500	0.408	1.121	0.358	0.913	0.174
5,000	0.425	1.101	0.462	0.945	0.193
5,200	0.432	1.092	0.501	0.956	0.200
5,500	0.441	1.079	0.553	0.967	0.211
6,000	0.456	1.059	0.633	0.979	0.229
7,000	0.486	1.017	0.763	0.992	0.265

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Table 10. Probabilistic decision table for Central Coast, AM2 model. See Table 6Table-6 for description.

2018 TAC (metric tonnes)	P(SB ₂₀₁₈ < 0.3SB ₀)	Med(SB ₂₀₁₈ / 0.3SB ₀)	P(SB ₂₀₁₈ < 10,700)	Med(SB ₂₀₁₈ < 10,700)	P(U ₂₀₁₈ < 20%)	P(U ₂₀₁₈ > 10%)	Med(U ₂₀₁₈)
0	0.034	1.933	0.047	1.844	0.000	0.000	0.000
3,000	0.069	1.791	0.087	1.712	0.011	0.386	0.091
3,320	0.074	1.776	0.092	1.697	0.021	0.500	0.100
4,000	0.083	1.744	0.102	1.667	0.069	0.709	0.120
4,500	0.090	1.721	0.111	1.645	0.121	0.810	0.135
5,150	0.100	1.690	0.124	1.616	0.215	0.893	0.153
6,000	0.115	1.649	0.142	1.578	0.360	0.942	0.178
6,800	0.133	1.612	0.159	1.543	0.502	0.968	0.200
6,900	0.135	1.608	0.162	1.538	0.522	0.970	0.203
7,000	0.137	1.603	0.165	1.534	0.540	0.973	0.206
9,000	0.184	1.511	0.212	1.445	0.791	0.992	0.261
10,550	0.221	1.440	0.250	1.378	0.894	0.997	0.303
12,000	0.259	1.372	0.286	1.315	0.936	0.999	0.341

Table 11. Probabilistic decision table for Central Coast, AM1 model. See Table 6Table-6 for description.

2018 TAC (metric tonnes)	P(SB ₂₀₁₈ < 0.3SB ₀)	Med(SB ₂₀₁₈ / 0.3SB ₀)	P(U ₂₀₁₈ < 20%)	P(U ₂₀₁₈ > 10%)	Med(U ₂₀₁₈)
0	0.007	2.675	0.000	0.000	0.000
3,000	0.014	2.545	0.001	0.088	0.059
3,320	0.015	2.530	0.002	0.133	0.065
4,000	0.016	2.501	0.009	0.260	0.078
4,500	0.018	2.481	0.018	0.372	0.088
5,150	0.021	2.455	0.037	0.502	0.100
6,000	0.024	2.421	0.079	0.657	0.116
6,800	0.027	2.387	0.132	0.766	0.132
6,900	0.028	2.383	0.139	0.777	0.133
7,000	0.028	2.379	0.147	0.788	0.135
9,000	0.037	2.299	0.347	0.922	0.172
10,550	0.045	2.234	0.502	0.964	0.201
12,000	0.056	2.173	0.635	0.982	0.227

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Table 12. Probabilistic decision table for Strait of Georgia, AM2 model. See Table 6 Table-6 for description.

2018 TAC (metric tonnes)	$P(SB_{2018} < 0.3SB_0)$	$Med(SB_{2018} / 0.3SB_0)$	$P(SB_{2018} < 10,700)$	$Med(SB_{2018} < 10,700)$	$P(U_{2018} > 20\%)$	$P(U_{2018} > 10\%)$	$Med(U_{2018})$
0	0.003	2.951	0.000	5.910	0.000	0.000	0.000
12,000	0.008	2.729	0.000	5.466	0.010	0.422	0.094
12,800	0.009	2.714	0.000	5.436	0.016	0.500	0.100
14,000	0.010	2.692	0.000	5.391	0.030	0.616	0.109
15,000	0.011	2.671	0.000	5.353	0.047	0.695	0.117
17,500	0.013	2.623	0.000	5.259	0.116	0.842	0.136
20,000	0.015	2.573	0.000	5.166	0.210	0.918	0.154
26,200	0.025	2.453	0.000	4.937	0.501	0.983	0.200
30,000	0.031	2.382	0.001	4.798	0.671	0.992	0.228
35,000	0.041	2.291	0.002	4.617	0.824	0.997	0.263
36,000	0.044	2.273	0.003	4.582	0.848	0.997	0.270
38,000	0.049	2.236	0.003	4.508	0.883	0.998	0.285

Table 13. Probabilistic decision table for Strait of Georgia, AM1 model. See Table 6 Table-6 for description.

2018 TAC (metric tonnes)	$P(SB_{2018} < 0.3SB_0)$	$Med(SB_{2018} / 0.3SB_0)$	$P(U_{2018} > 20\%)$	$P(U_{2018} > 10\%)$	$Med(U_{2018})$
0	0.001	3.452	0.000	0.000	0.000
12,000	0.002	3.275	0.002	0.151	0.069
12,800	0.003	3.264	0.003	0.197	0.074
14,000	0.003	3.247	0.005	0.277	0.081
15,000	0.003	3.232	0.009	0.342	0.086
17,500	0.004	3.193	0.025	0.501	0.100
20,000	0.004	3.156	0.054	0.641	0.114
26,200	0.006	3.066	0.189	0.851	0.148
30,000	0.009	3.008	0.316	0.922	0.168
35,000	0.011	2.935	0.472	0.961	0.195
36,000	0.012	2.919	0.501	0.968	0.200
38,000	0.015	2.890	0.559	0.977	0.211

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Table 14. Probabilistic decision table for West Coast of Vancouver Island, AM2 model. See Table 6Table-6 for description.

2018 TAC (metric tonnes)	P(SB ₂₀₁₈ < 0.3SB ₀)	Med(SB ₂₀₁₈ / 0.3SB ₀)	P(SB ₂₀₁₈ < 10,700)	Med(SB ₂₀₁₈ < 10,700)	P(U ₂₀₁₈ < 20%)	P(U ₂₀₁₈ > 10%)	Med(U ₂₀₁₈)
0	0.203	1.413	0.447	1.064	0.000	0.000	0.000
2,000	0.272	1.315	0.505	0.993	0.033	0.476	0.097
2,075	0.276	1.311	0.508	0.990	0.040	0.503	0.100
3,000	0.310	1.267	0.537	0.957	0.193	0.812	0.143
3,610	0.330	1.239	0.553	0.936	0.342	0.905	0.170
4,300	0.354	1.208	0.576	0.912	0.502	0.955	0.200
5,000	0.380	1.175	0.596	0.888	0.644	0.978	0.231
6,000	0.410	1.130	0.623	0.854	0.790	0.990	0.272
7,500	0.459	1.063	0.662	0.801	0.906	0.997	0.332
8,000	0.476	1.041	0.675	0.784	0.928	0.999	0.352
9,000	0.503	0.996	0.698	0.751	0.957	1.000	0.389
10,000	0.533	0.952	0.717	0.718	0.974	1.000	0.426

Table 15. Probabilistic decision table for West Coast of Vancouver Island, AM1 model. See Table 6Table-6 for description.

2018 TAC (metric tonnes)	P(SB ₂₀₁₈ < 0.3SB ₀)	Med(SB ₂₀₁₈ / 0.3SB ₀)	P(U ₂₀₁₈ < 20%)	P(U ₂₀₁₈ > 10%)	Med(U ₂₀₁₈)
0	0.050	1.980	0.000	0.000	0.000
2,000	0.070	1.904	0.002	0.091	0.056
2,075	0.071	1.901	0.003	0.103	0.058
3,000	0.085	1.866	0.018	0.343	0.084
3,610	0.092	1.843	0.046	0.500	0.100
4,300	0.102	1.817	0.101	0.656	0.118
5,000	0.110	1.791	0.180	0.771	0.137
6,000	0.124	1.753	0.309	0.873	0.163
7,500	0.146	1.698	0.501	0.947	0.200
8,000	0.154	1.680	0.563	0.957	0.213
9,000	0.169	1.644	0.665	0.975	0.237
10,000	0.185	1.608	0.746	0.986	0.261



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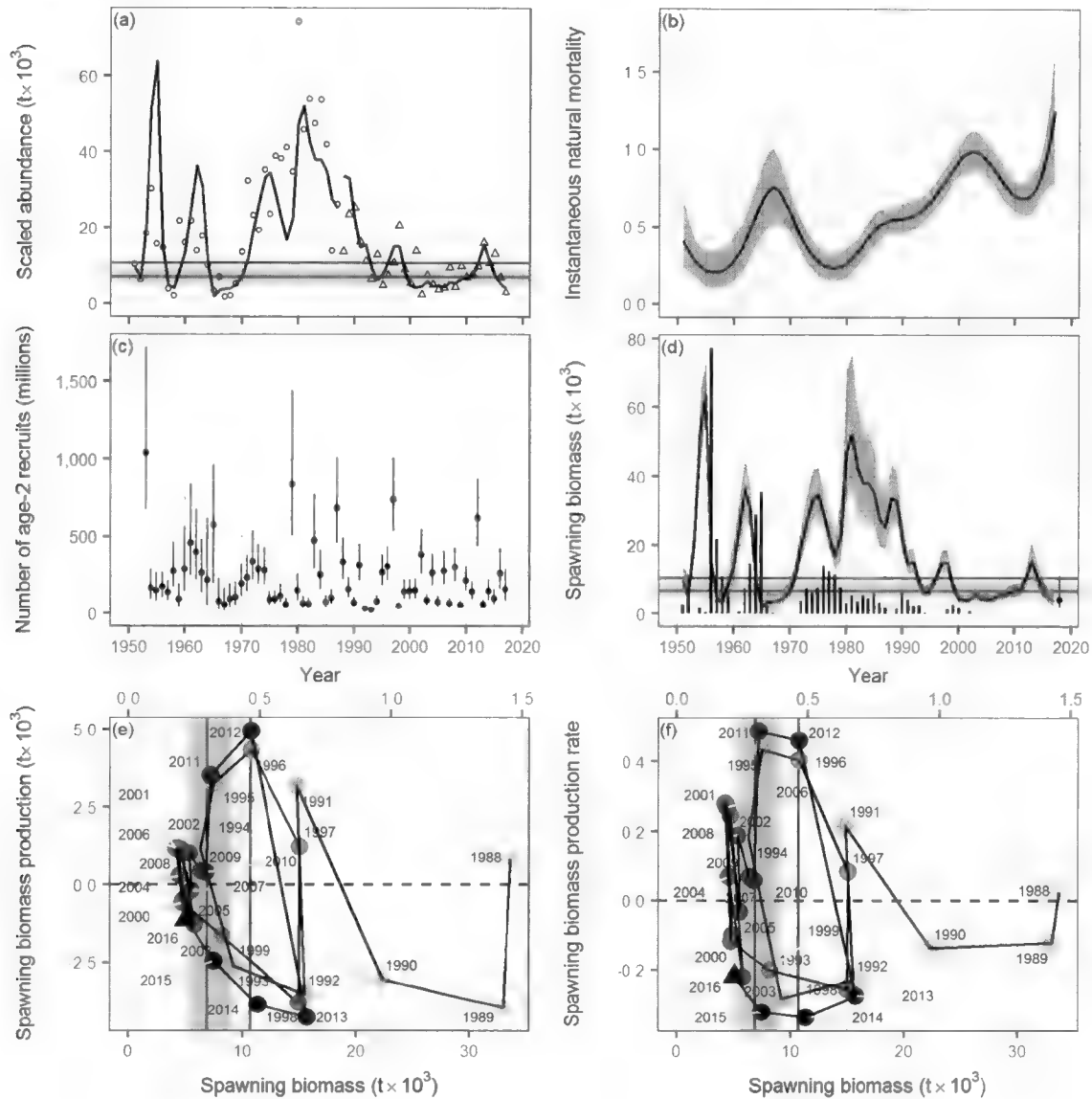
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Figures



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Figure 2. Model output for Pacific Herring in the HG major stock assessment region for AM2. Panel (a): model fit to time series of scaled spawn survey data in thousands of metric tonnes ($t \times 10^3$). The spawn index has two distinct periods defined by the dominant survey method: surface surveys (1951 to 1987), and dive surveys (1988 to 2017). The spawn survey data (i.e., spawn index) is scaled to abundance via the spawn survey scaling parameter q . Panel (b): posterior estimates of instantaneous natural mortality. Line and shaded area indicate the median and 90% credible interval, respectively. Panel (c): reconstructed number of age-2 recruits in millions. Circles with vertical lines indicate medians and 90% credible intervals, respectively. Panel (d): posterior estimate of spawning biomass (SB_t) for each year t in thousands of metric tonnes ($t \times 10^3$). Line and shaded area indicate median and 90% credible interval, respectively. Also shown is projected spawning biomass assuming no fishing (SB_{2018}) at the far right: the circle and vertical line indicates the median and 90% credible interval, respectively. Time series of vertical lines indicates commercial catch, excluding spawn on kelp (SOK). Panels (e & f): phase plots of spawning biomass production and spawning biomass production rate against spawning biomass, respectively, for the dive survey period (MPD estimates). The black triangle indicates 2016. Grey shading becomes darker in chronological order. The axis scale at the top of panels (e & f) is spawning biomass depletion, SB/SB_0 . Panels (a, d, e, & f): red lines indicate median and red shading indicates 90% credible interval for the limit reference point (LRP), $0.3SB_0$, where SB_0 is the estimated unfished biomass; if present, horizontal and vertical blue lines indicate 1996 fixed cutoffs, AM2 plots only (HG: 10,700 t, PRD: 12,100 t, CC: 17,600 t, SOG: 21,200 t, WCVI: 18,800 t). Scales are different between AM2 and AM1 (shown in separate figures).

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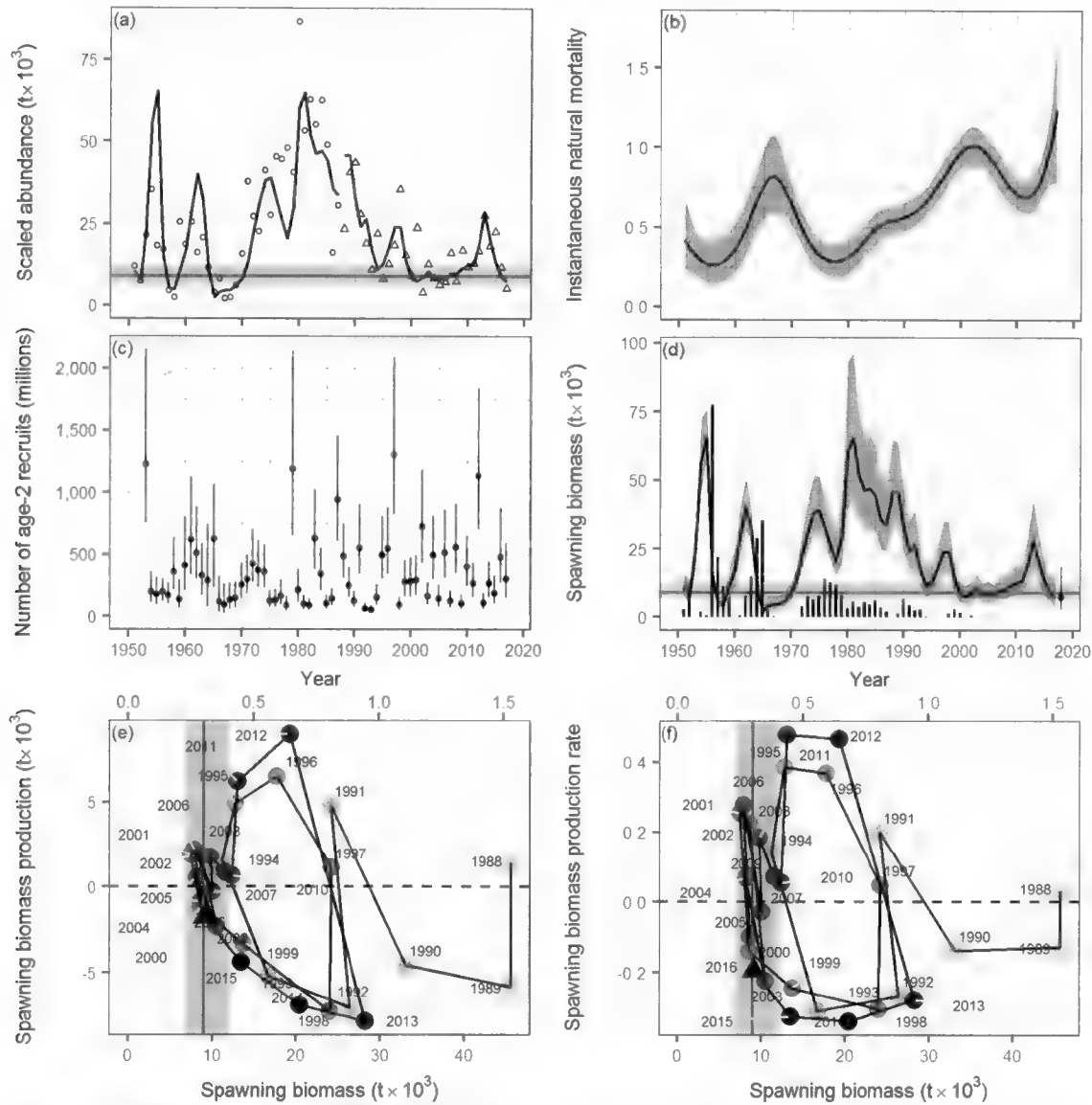


Figure 3. Model output for Pacific Herring in the HG major stock assessment region for AM1. See Figure 2 for description.

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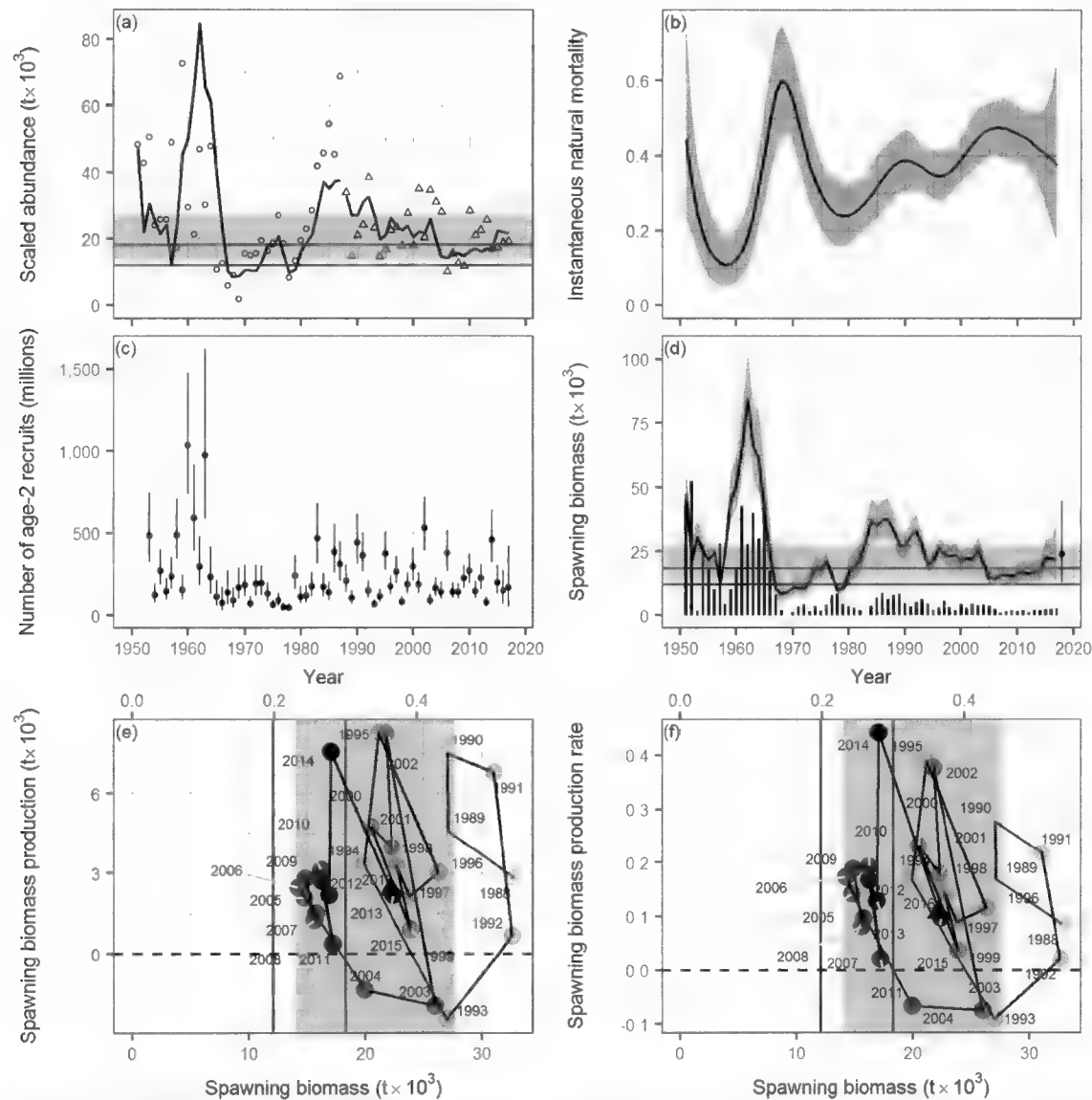


Figure 4. Model output for Pacific Herring in the PRD major stock assessment region (SAR) for AM2. See Figure 2 for description.

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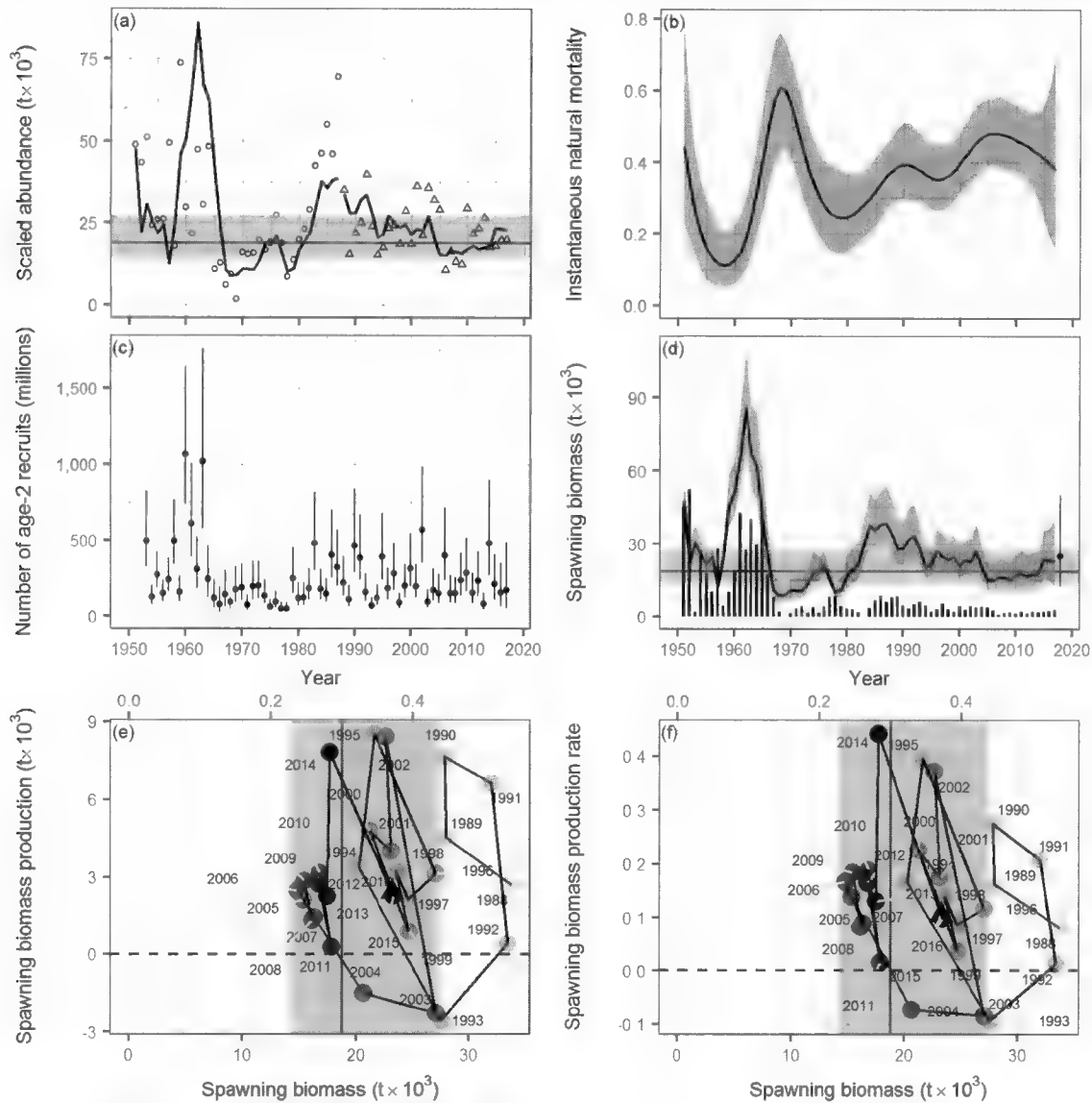


Figure 5. Model output for Pacific Herring in the PRD major stock assessment region for AM1. See Figure 2 for description.

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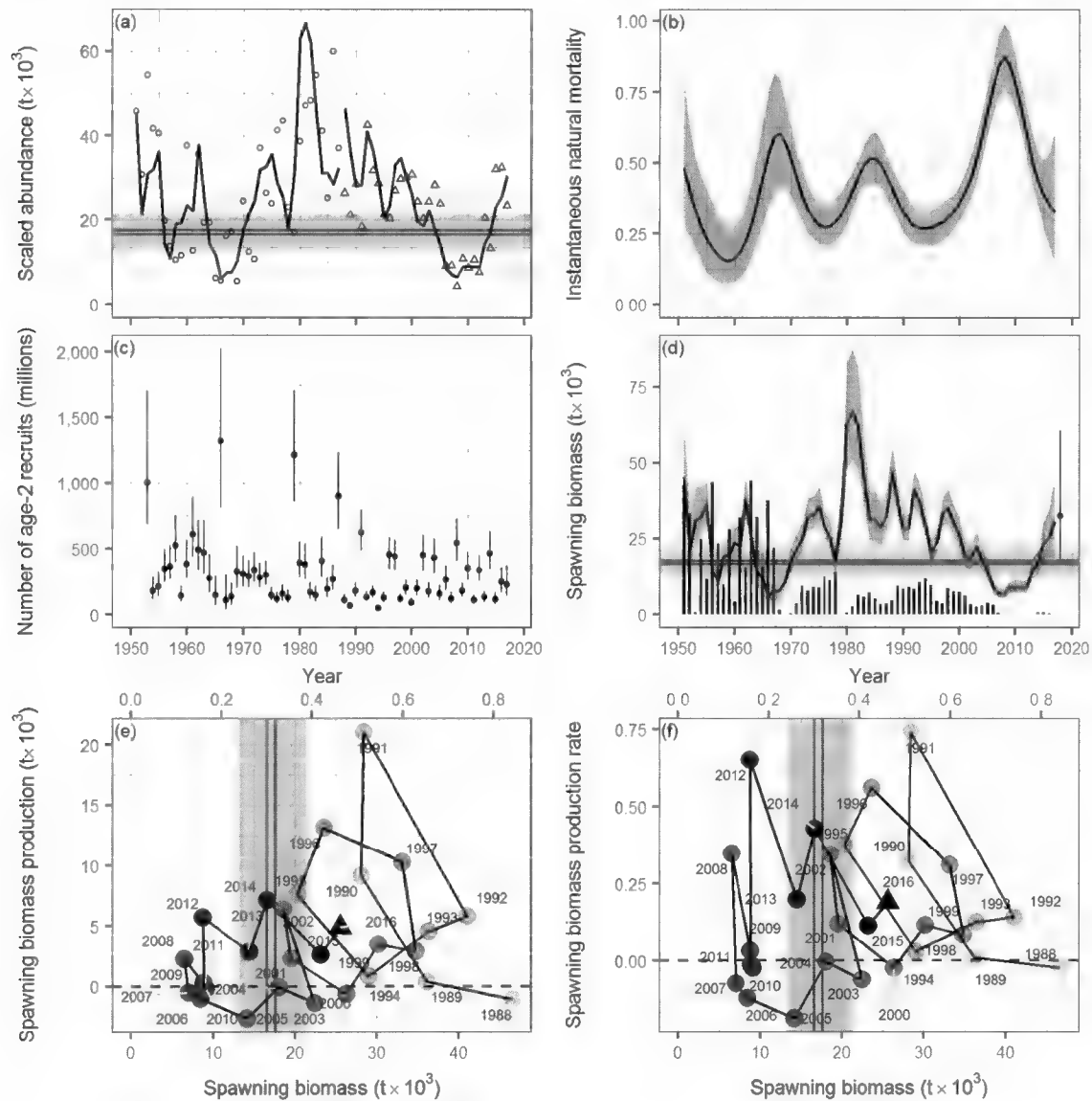


Figure 6. Model output for Pacific Herring in the CC major stock assessment region for AM2. See Figure 2 for description.

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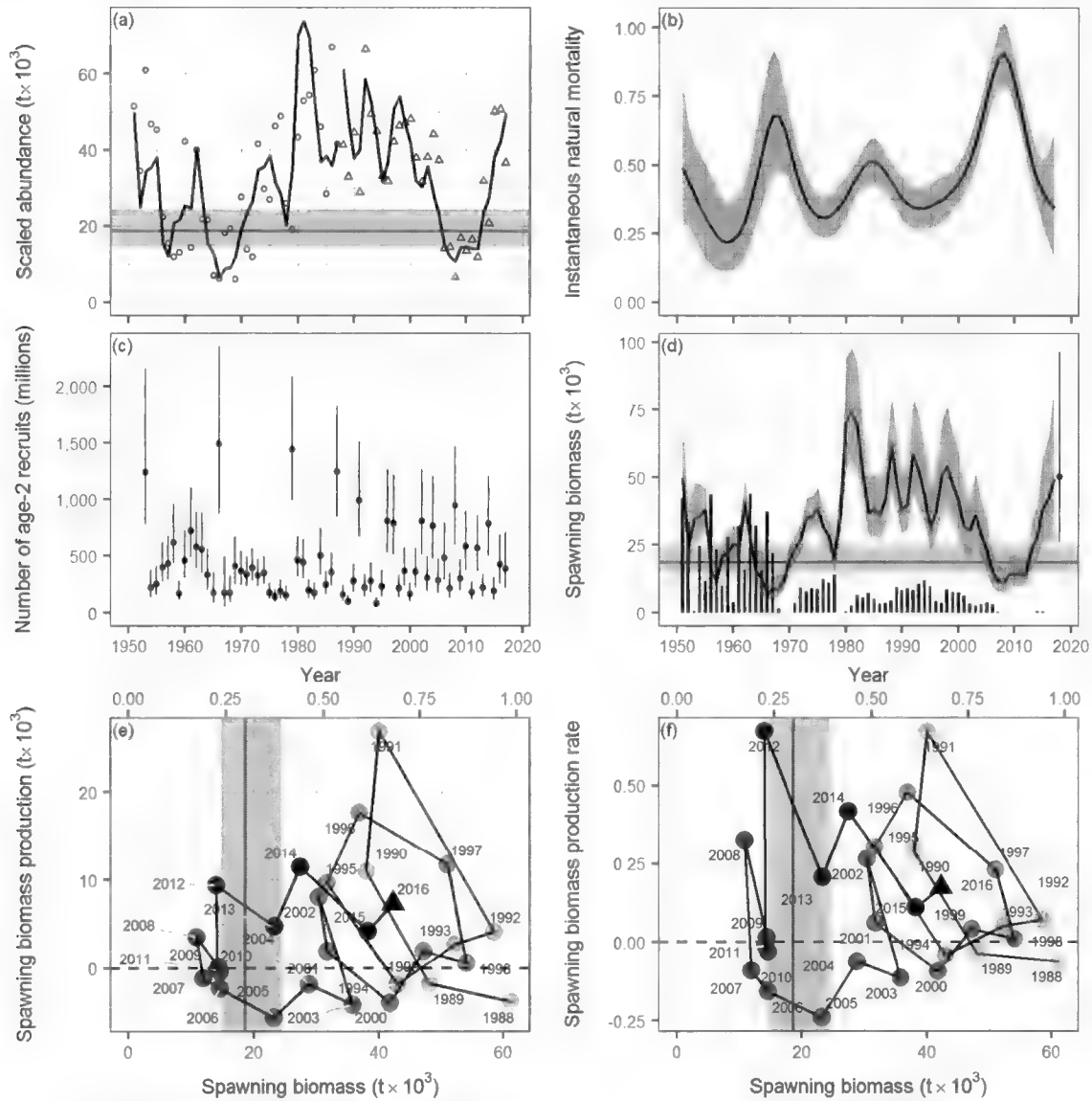


Figure 7. Model output for Pacific Herring in the CC major stock assessment region for AM1. See Figure 2 for description.

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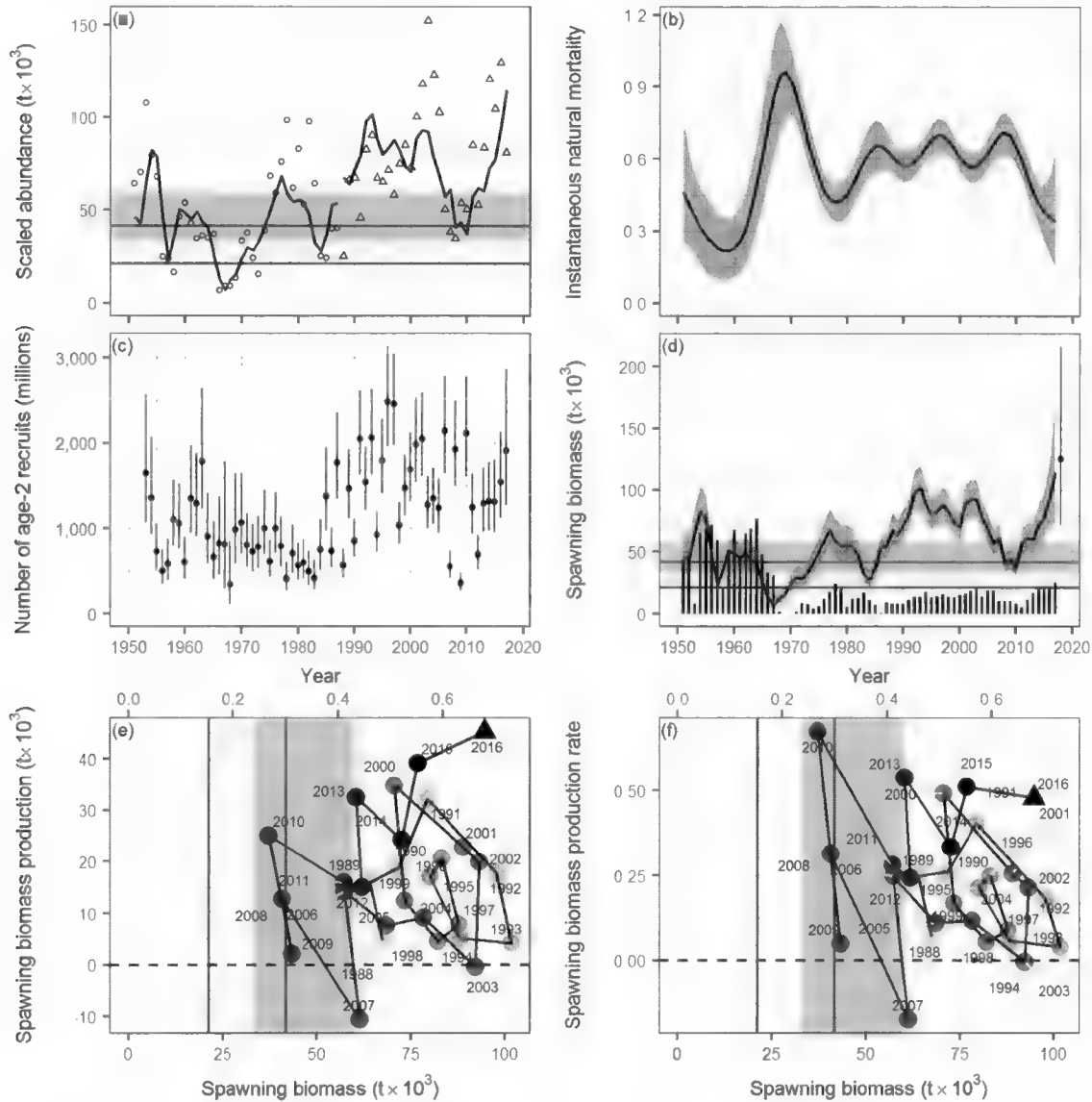


Figure 8. Model output for Pacific Herring in the SOG major stock assessment region for AM2. See Figure 2 for description.

Pacific Region

DRAFT – Pacific Herring 2017 Status and 2018 Forecast

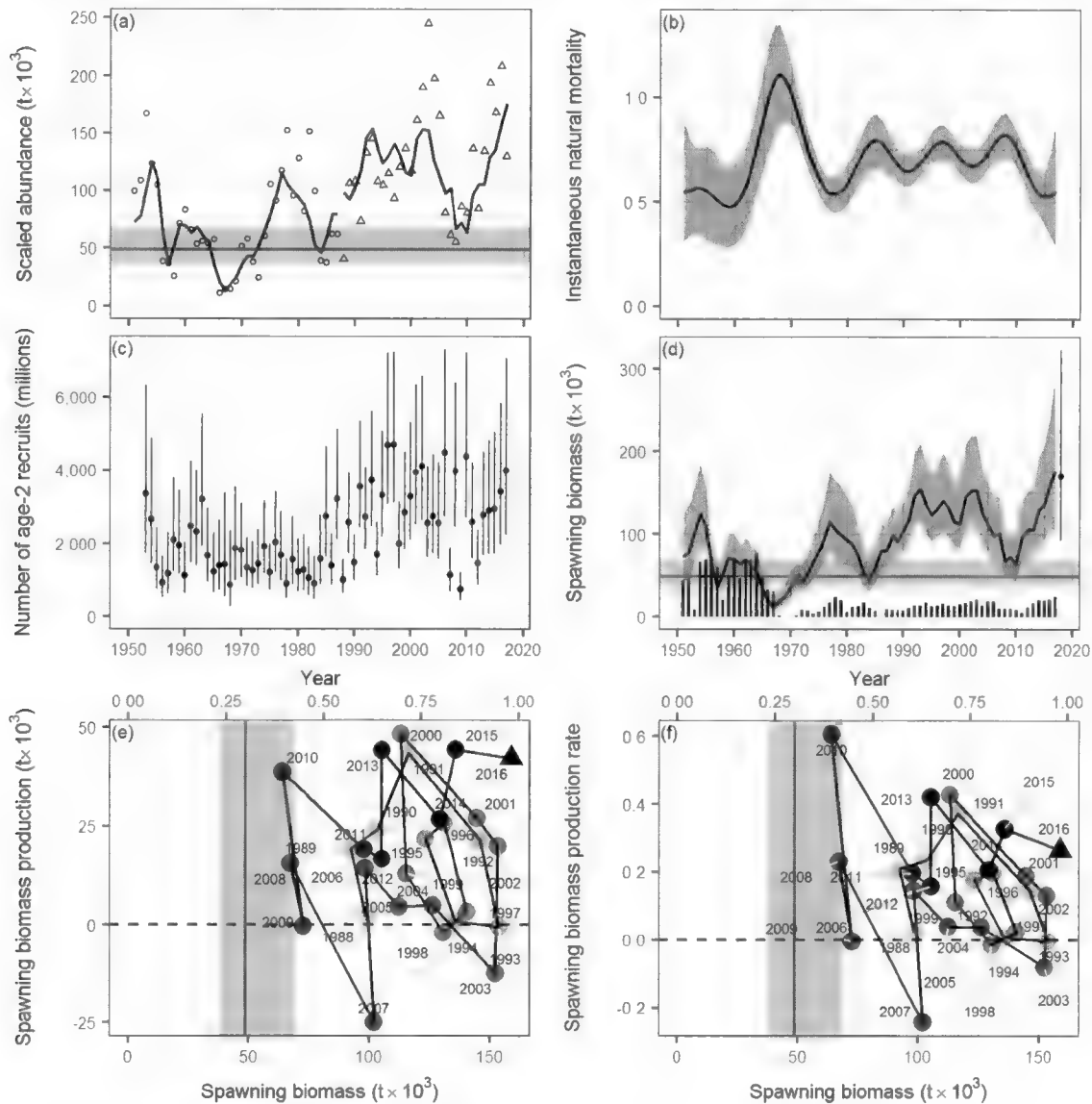


Figure 9. Model output for Pacific Herring in the SOG major stock assessment region for AM1. See Figure 2 for description.

Pacific Region

DRAFT – Pacific Herring 2017 Status and 2018 Forecast

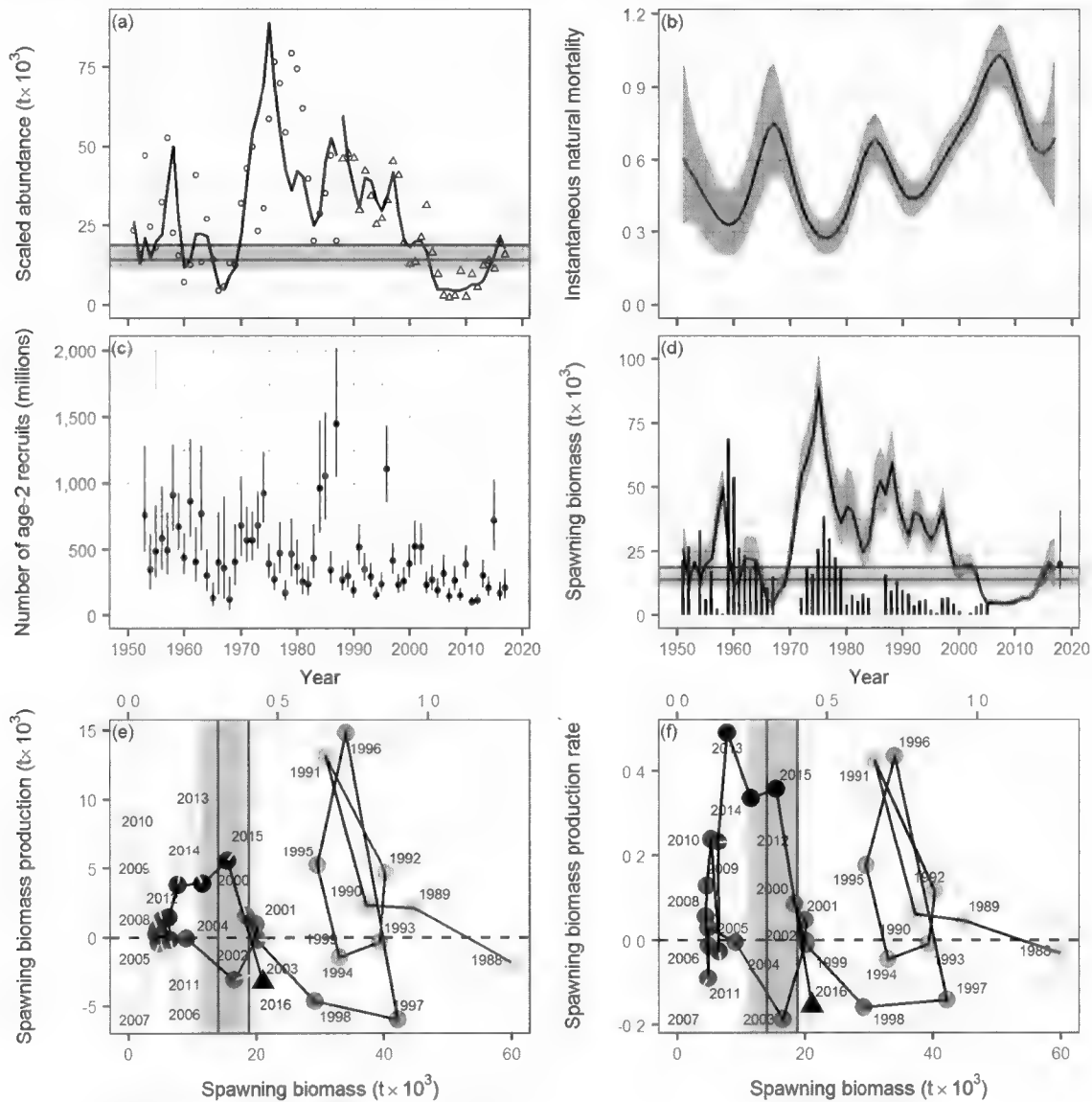


Figure 10. Model output for Pacific Herring in the WCVI major stock assessment region for AM2. See Figure 2 for description.

Pacific Region

DRAFT – Pacific Herring 2017 Status and 2018 Forecast

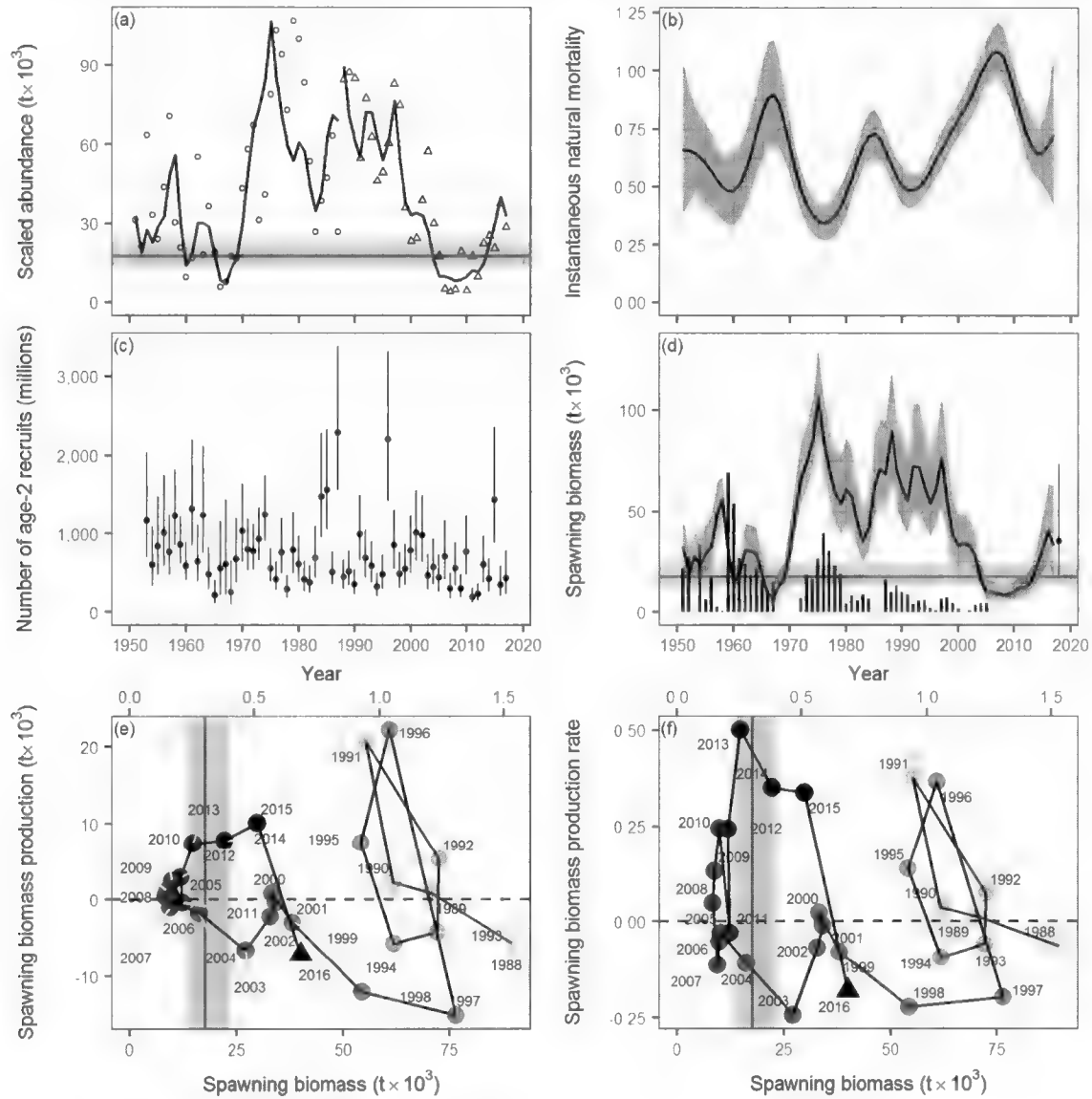


Figure 11. Model output for Pacific Herring in the WCVI major stock assessment region for AM1. See Figure 2 for description.

Pacific Region

DRAFT – Pacific Herring 2017 Status and 2018 Forecast

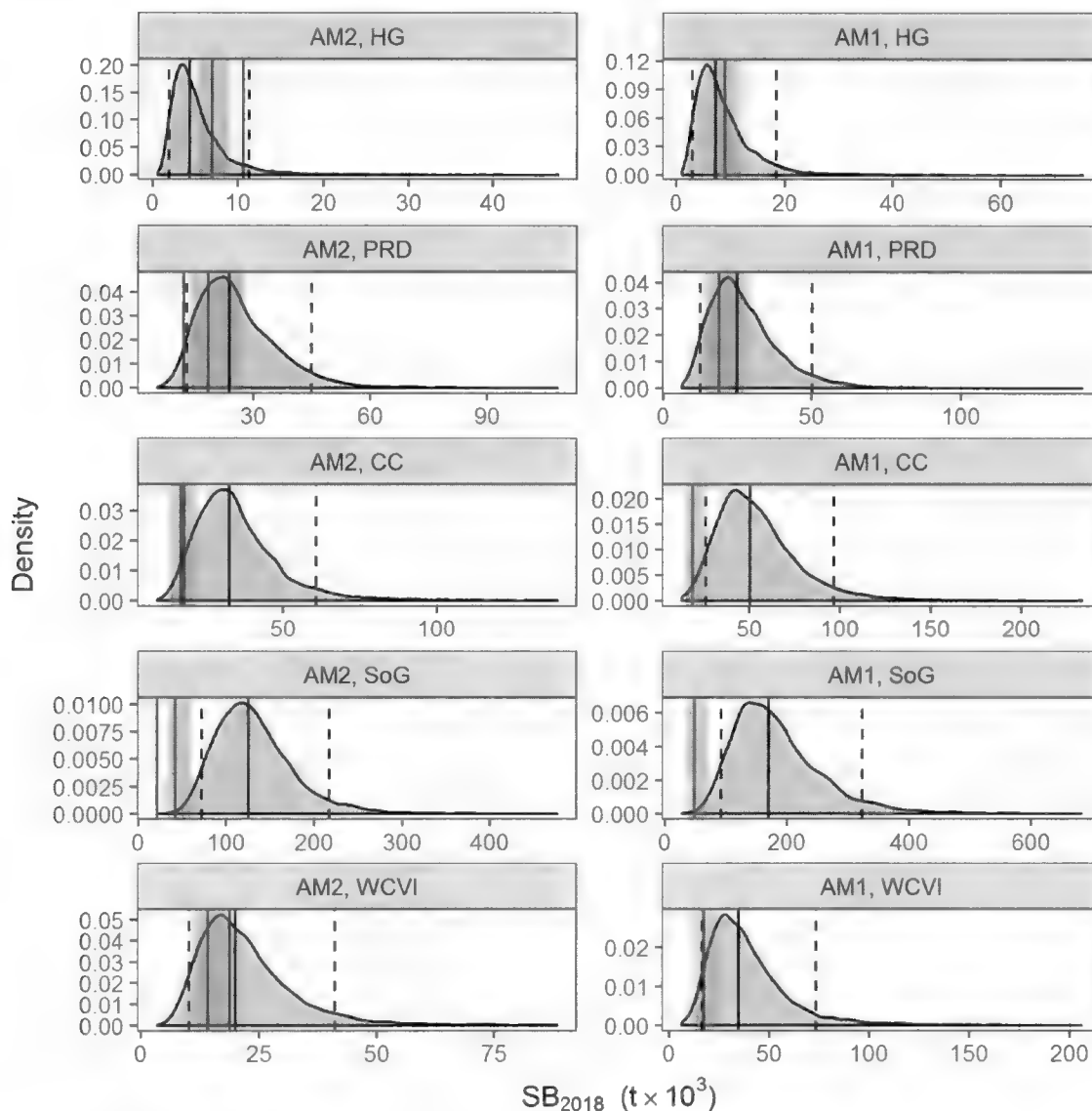


Figure 12. Predicted spawning biomass assuming no fishing in 2018, SB_{2018} in thousands of tonnes, t for Pacific Herring in the major stock assessment regions for models AM2 and AM1. Vertical black lines indicate medians (solid) and 90% credible intervals (dashed) for SB_{2018} . Vertical red lines indicate medians, and red shading indicates 90% credible intervals for the limit reference point (LRP), $0.3SB_0$, where SB_0 is the estimated unfished biomass. If present, vertical blue lines indicate 1996 fixed cutoffs, AM2 plots only (HG: 10,700 t, PRD: 12,100 t, CC: 17,600 t, SOG: 21,200 t, WCVI: 18,800 t).

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MPO. 2017. << insérez le titre ici – il doit correspondre exactement à celui de la page couverture, mais en lettres minuscules >>. Secr. can. de consult. sci. du MPO, Avis sci. 2017/nnn. (Style: citation – other language)



Fisheries and Oceans Pêches et Océans
Canada Canada

HIAB/IHHPC 2017/2018 Season Planning

November 8/9, 2017

Canada



Purpose

To outline the context and key decisions required for the upcoming 2017/18 Pacific herring season, including:

1. Flag key decisions for 2017/2018 based on CSAP results.
2. Build an understanding of considerations for each stock area.
3. Identify further information needed for decision making on harvest approach.
4. Discuss key points status relative to planning timeline.



CSAP Meeting Oct 17/18, Draft SAR released Oct 30

For ALL AREAS:

- Decision tables with harvest metrics provided for AM1 and AM2.
- Updated production analysis provided for all areas. Stock status and 2018 forecasts relative to LRP provided (new).
- Stocks forecasted to be at similar levels to 2017 or increasing in all areas.
- Size at age increasing over past several years, this follows a long period of size at age declines.
- Candidate Upper Stock References (USR) also presented.



CSAP: Application of AM1 vs AM2 for 2017/2018 Planning:

AM2 has been used prior to 2011, 2015/16 and 2016/2017. Assumes all spawn is observed by the survey, acknowledged to not be correct but a minimum estimate.

*SAR: "Resolution between the performance of the AM2 and AM1 parameterizations of spawn coefficient will **require a simulation-evaluation analysis**. Neither the bridging analysis nor the sensitivity analyses were able to definitively support either one of the base case models over the other. Therefore **we support the continued use of these two base case models** for each of the five major herring stocks."*

- Application of **AM2** would be consistent with previous several years while simulation is undertaken.
- **AM2** results in similar or lower stock forecasts, and in lower relative removal levels.
- This would be a precautionary measure while the simulation-evaluation work is undertaken.



Limit Reference Points

- States of low production and low biomass (LP-LB) are associated with possible serious harm, occurring at biomass levels at or below 0.30Bo.
- SAR includes an updated production analysis, current stock status relative to the LRP, and the probability of the projected stock status being below the LRP at various catch levels.
- Application: To mitigate short-term consequences to resource users, *Kronlund et al. (2017)* recommend the phasing-in of any new management procedure (i.e. changes to data collection, stock assessment models and/or harvest control rules) to avoid LRPs and achieve targets.
- Candidate Upper Stock References (USR) are also presented in the CSAS Research Document

Example Decision Table with new LRP(e.g. PRD)

Now: LRP indicates p of breaching at given harvest levels

[illegible]

Before: Used commercial cutoff and 50p of exceeding 20% HR



Key decisions and information for 2017/2018

1. This is a period of transition with provision of LRP (and soon USR).
2. LRP has been identified for 5 major stocks, and will inform decision making.
3. Phased in approach designed to avoid LRPs and achieve targets is recommended to minimize short term impacts to resource users.
4. Area specific information: stock trends, age composition, natural mortality, recent removal rates, objectives.
5. An MSE process, with engagement of managers and resource-users, is recommended to identify measurable objectives associated with both LRPs and target reference points for Pacific Herring.



Snapshot: Coast wide LRP Implications

- **HG:** Median forecast well below LRP.
- **PRD:** Median forecast above but near to LRP (LRP is higher than previous cutoff level).
- **CC:** Median forecast well above LRP.
- **SOG:** Median forecast well above LRP.
- **WCVI:** Median forecast above LRP (LRP is lower than previous cutoff level)



Coast wide Metrics, by Area

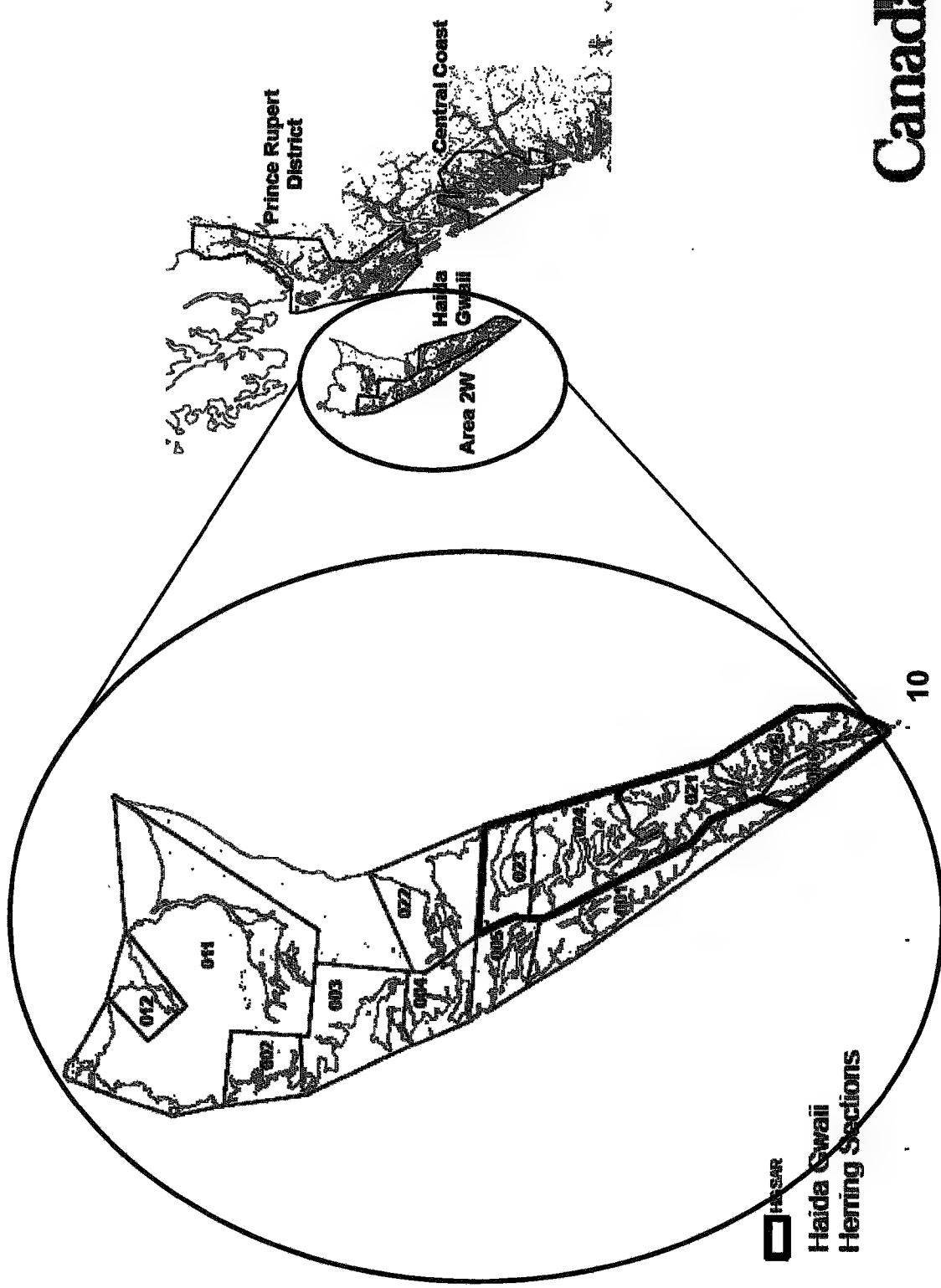
Median values using AM2 in metric tonnes					
	SB2017	SB2018	Cutoff	LRP	2018 Rel. LRP
					2018 P SB<LRP
HG	3,963	4,346	10,700	6,929	-2,583 0.808
PRD	21,738	23,924	12,100	18,329	5,595 0.265
CC	30,474	32,458	17,600	16,604	15,854 0.034
SOG	114,626	125,285	21,200	41,638	83,647 0.003
WCVI	17,742	20,003	18,800	14,067	5,936 0.203



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Haida Gwaii (Areas 1 and 2) and 2W

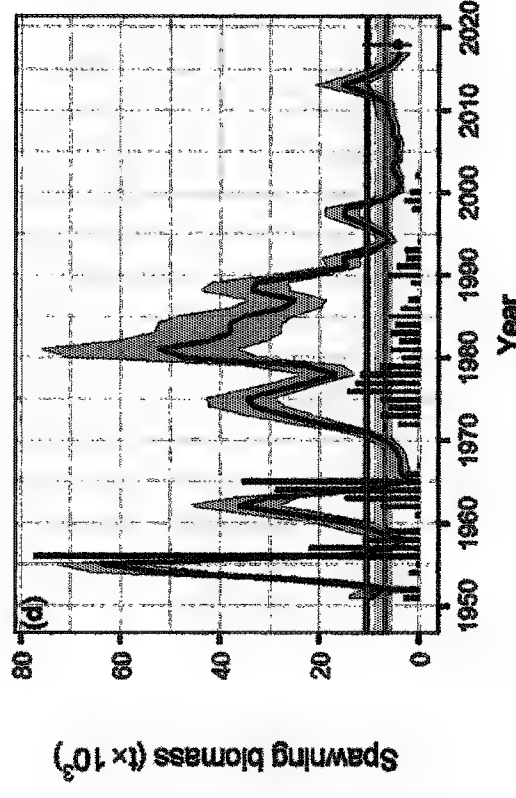


Canada

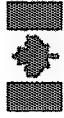


HG

- Updated production analysis: SB production is negative. Stock is in a low productivity low biomass (LP-LB) state.
- In 2018, there is an 81% (AM2) probability the stock will be below the LRP in the absence of fishing, and a 94% (AM2) probability the stock will be below the fixed cutoff of 10,700 t.
- Haida Nation have recommended continued closure of the HG fishery for a 2-3 year period (even if stocks move above the cut-off) to allow for rebuilding.



Trend line=estimated spawning biomass
Blue Line= previous cutoff level
Red line/envelope=LRP with C.I.
Black bars=commercial catch



Haida Gwaii (Areas 1 and 2) and 2W

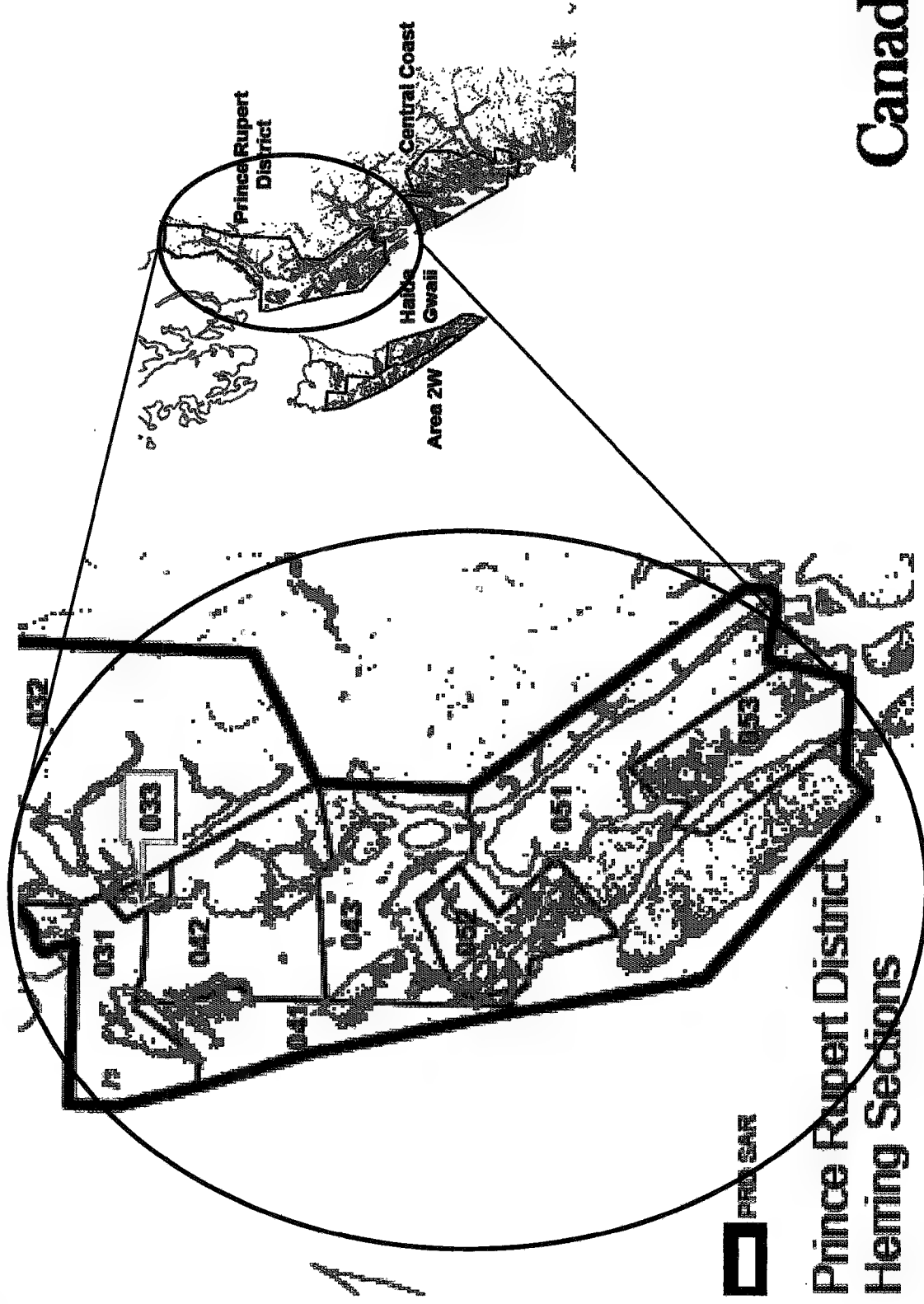
1. 2017 Fisheries:
 - FSC only
 - 10 SOK licenses and no one elected to fish in 2W
2. Stock Assessment Resources
 - 19-day spawn reconnaissance charter
 - 25-day biological sampling/test charter (incl. 2W)*
 - 18-day dive spawn charter*
 - 6-day surface spawn charter (2W)
 - FN activities: CHN sounding vessel (unconfirmed)
3. DFO FAM resources: Peter Katinic and Darren Chow
4. Not expected to be any commercial fisheries in 2018
5. No spawn survey in 2017 in 2W



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Prince Rupert District (Areas 3 to 5)

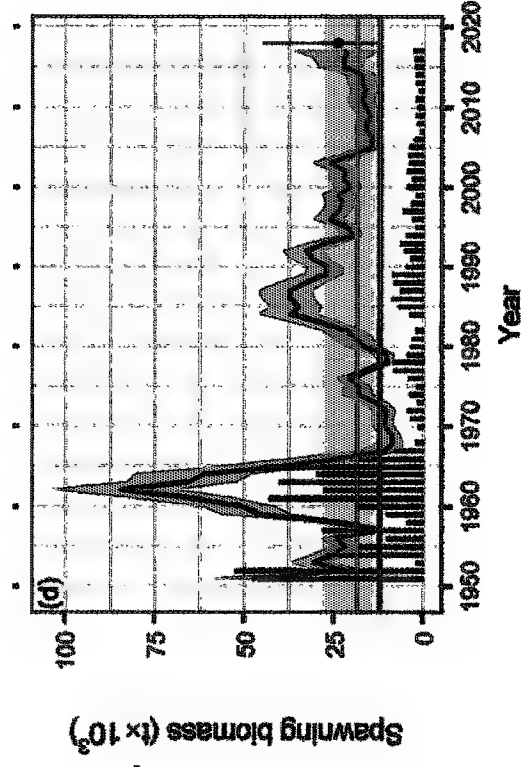


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PRD

- Updated production analysis: Positive SB production since 2005, indicating stock growth.
- Two periods of consistent and stable SB: 1996-2003 and 2006-2017.
- Continued stable trend in SB, with projected pre-fishery SB_{2018} of 23,924 t (AM2) consisting of 23% age-3 fish and 68% age-4 and older fish.
- In 2018, there is greater than a 50% probability the estimated spawning biomass will be above the LRP of $0.3SB_0$, in the absence of fishing
 - 27% probability the stock will be below the LRP in the absence of fishing
 - 3% probability the stock will be below the fixed cutoff of 12,100 t
- LRP of $0.3SB_0$ associated with evidence of possible serious harm observed on HG, CC, WCVI.
- LP-LB states not observed for PRD and SOG.
- PRD is a key area for roe herring seine and gillnet.
- PRD has supported stable catch for an extended period, and stocks are stable.





Prince Rupert District (Areas 3 to 5)

1. 2017 Fisheries:

- FSC: 600t expected use
- SOK: 10 SOK licenses for 1000t expected use
- F&B: 500t
- Special Use: 130t
- Roe (Seine and Gillnet): 2500t

2. Stock Assessment Resources

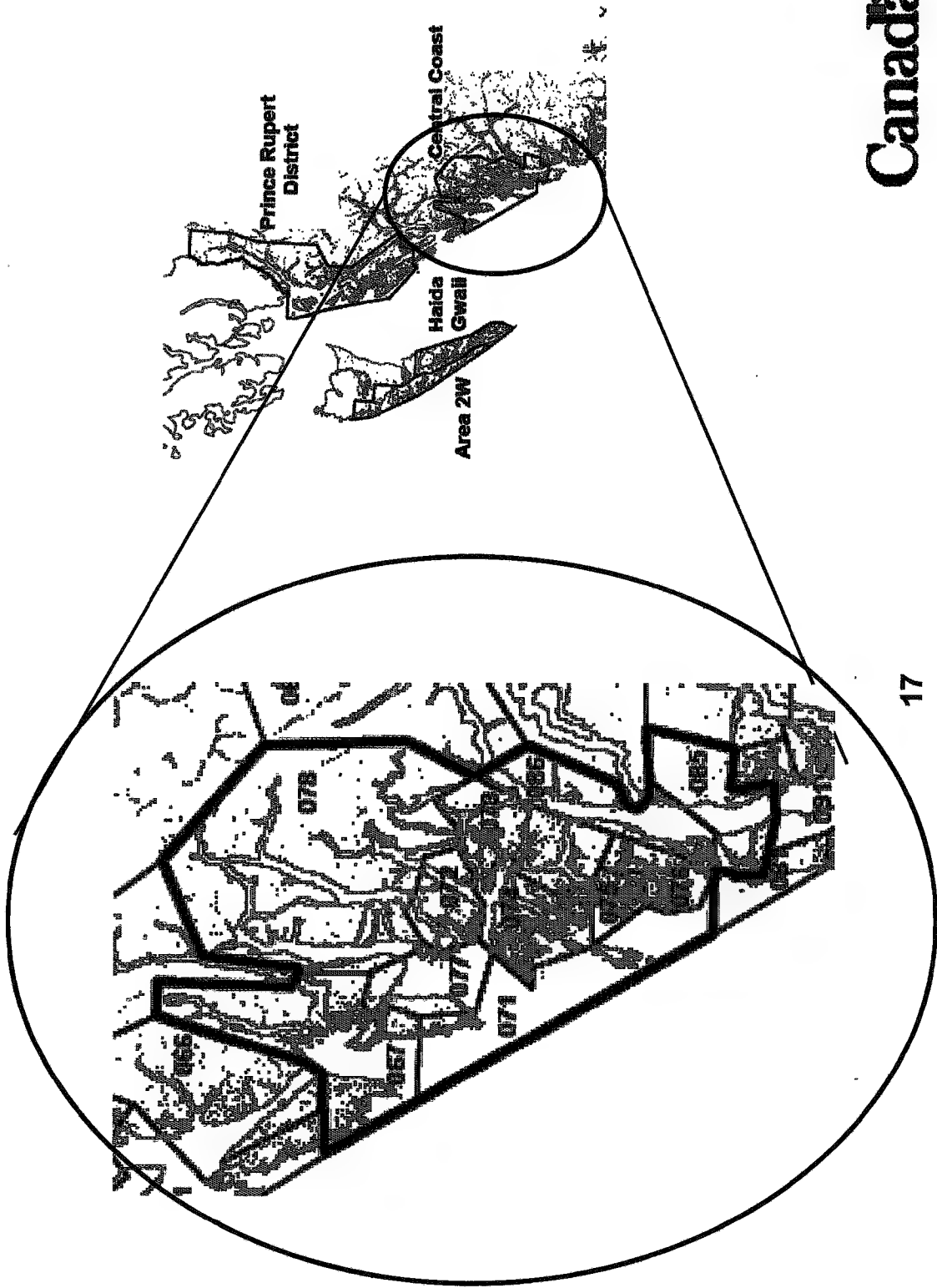
- Spawn flights
- 13-day biological sampling/test charter (Kitkatla)*
- 13-day biological sampling/test charter (Big Bay)*
- 20-day dive spawn charter*
- FN activities: Unconfirmed



Prince Rupert District (Areas 3 to 5)

3. DFO FAM resources:
 - Corey Martens is the lead manager: on Test Charter boat
 - Jeff Radford will be the liaison for the North and Central in the Prince Rupert office
4. Other Resources:
 - Lax Kwalaams First Nation fisheries program in Big Bay
 - Gitxaala First Nation fisheries observer and survey assistance in Kitkatla Inlet:
5. Questions:
 - What should be considered when thinking about harvest planning in this area.
 - How should LRP be considered for harvest planning?
 - What recommendations would you make for harvest planning, and why?

Central Coast (Areas 6 to 8) and Area 10





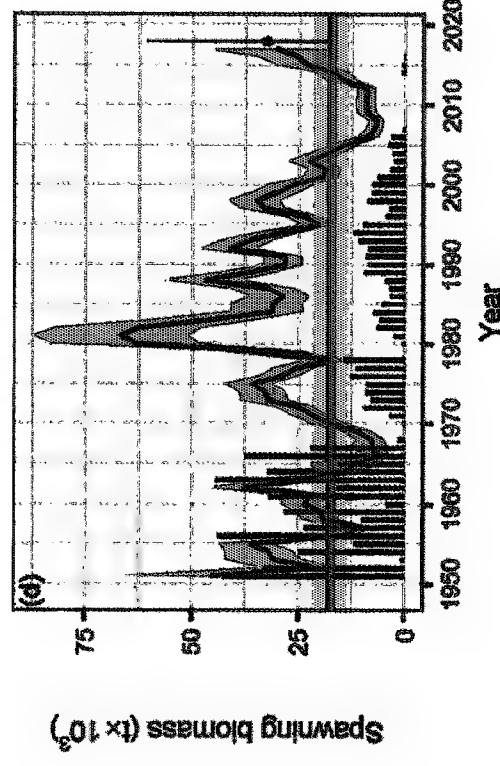
- Updated production analysis: Positive SB production since 2012, indicating stock growth.
- Projected pre-fishery SB_{2018} is 32,458 t (AM2) similar to SB_{2017} (30,474 t).
- In 2018, there is greater than a 95% probability the estimated spawning biomass will be above the LRP of $0.3SB_0$, in the absence of fishing.
 - 3% probability the stock will be below the LRP in the absence of fishing
 - 5% probability the stock will be below the fixed cutoff of 17,600 t

Trend line=spawning biomass

Blue Line= previous cutoff level

Red line/envelope=LRP with confidence intervals

Black bars=commercial catch



Central Coast (Areas 6 to 8) and Area 10

1. 2017 Fisheries:

- FSC: 600t
- SOK: 6 SOK licenses and Heiltsuk allocation (293K lbs)
 - 3 licenses in Area 10
- Roe (Seine): 215t

2. Stock Assessment Resources

- Spawn flights- budget available but no plane. Alternatives?
- No early biological sampling/test charter
- 21-day biological sampling/test charter (HTC AFS program)
- 21-day dive spawn charter*
- 12-day dive spawn charter* (SOG/CC split charter)
- FN activities: GN sounding vessels; Kitasoo dive survey



Central Coast (Areas 6 to 8) and Area 10

3. DFO FAM resources:

- Steven Groves, Kristen Wong and Brad Koroluk are managers

4. Other:

- Heiltsuk Fisheries program as designates on test boat and management platform, Heiltsuk communications coordinator
- CCGS Vector March 15th to April 6th
- Joint Management Plan with the Heiltsuk
- Kitasoo Herring Management Plan and
- Area 10 - GNN Herring Spawn Monitoring & Dive Surveys

5. Questions:

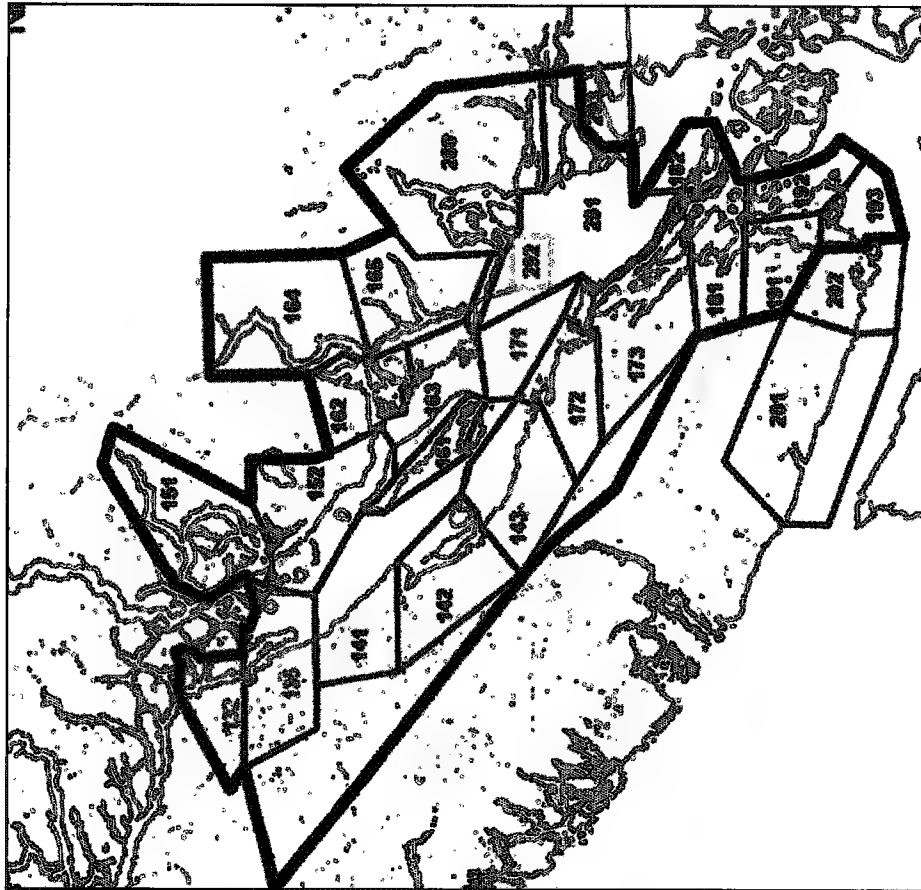
- What should be considered when thinking about harvest planning in this area.
- How should LRP be considered for harvest planning?
- What recommendations would you make for harvest planning, and why?



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SOG: Areas 13 to 18, 29

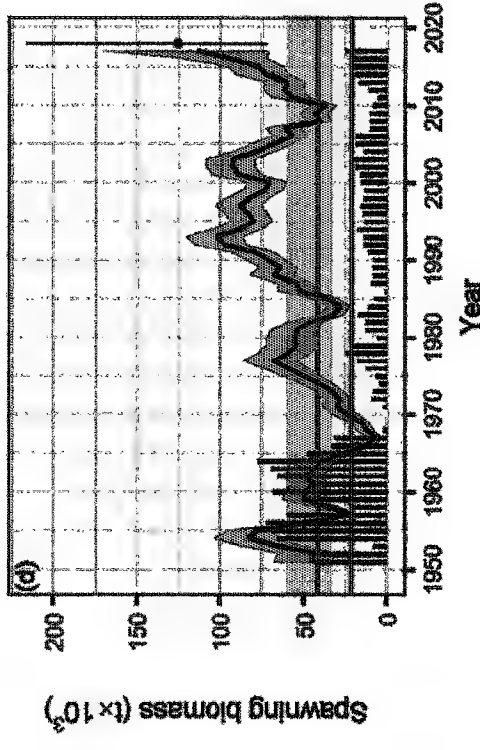


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SOG: Areas 13 to 18, 29

- Updated production analysis: SB production has been positive since 2008, indicating stock growth.
- In 2018, there is greater than a 95% probability the estimated spawning biomass will be above the LRP of $0.3SB_0$, in the absence of fishing.
 - 0.3% probability the stock will be below the LRP in the absence of fishing
 - 0.0% probability the stock will be below the fixed cutoff of 21,200 t
- 2017 catch was highest since 1972.
- First Nations have requested the area south of Nanaimo and Sunshine Coast be closed for five years due to limited observed spawn in these areas.





SOG: Areas 13 to 18, 29: Key Fisheries

FSC: Whole herring, spawn on boughs, spawn on seaweed.

- Limited spawn on kelp due to limited distribution of macrocystis).
- Lack of spawning stocks in area 17S in recent years has impacted FSC access.

Commercial: Overall commercial catch in 2016/2017 season was largest since 1972.

1. **Roe herring:** largest seine and gillnet fisheries on the coast.
 - Effort concentrated in Area 14 and 17 N due to recent fish distribution.
 - Sea lions impacts to testing and fishing efforts in recent years.

2. **Food and Bait** Herring catches increased and make up roughly a third of the commercial catch in recent years.

3. **Special Use** fishery is only active in this area, small operations with limited and specific marketing needs.



SOG: Areas 13 to 18, 29

Stock Assessment Resources

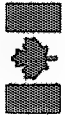
- Spawn flights
- 27 day biological sampling/test charter
- 21 day dive spawn charter
- 12 day dive spawn charter (SOG/CC split charter)
- 15 day shore-based dive spawn team (WCVI/SOG split charter)

DFO Management Resources

- Resource Managers – Two seine, one gillnet, one Food and Bait, one Special Use
- DFO funded management vessel – 15 day

Other Resources:

- First Nation's communications coordinator – funding currently unconfirmed



Area: SOG

Key Questions for this area:

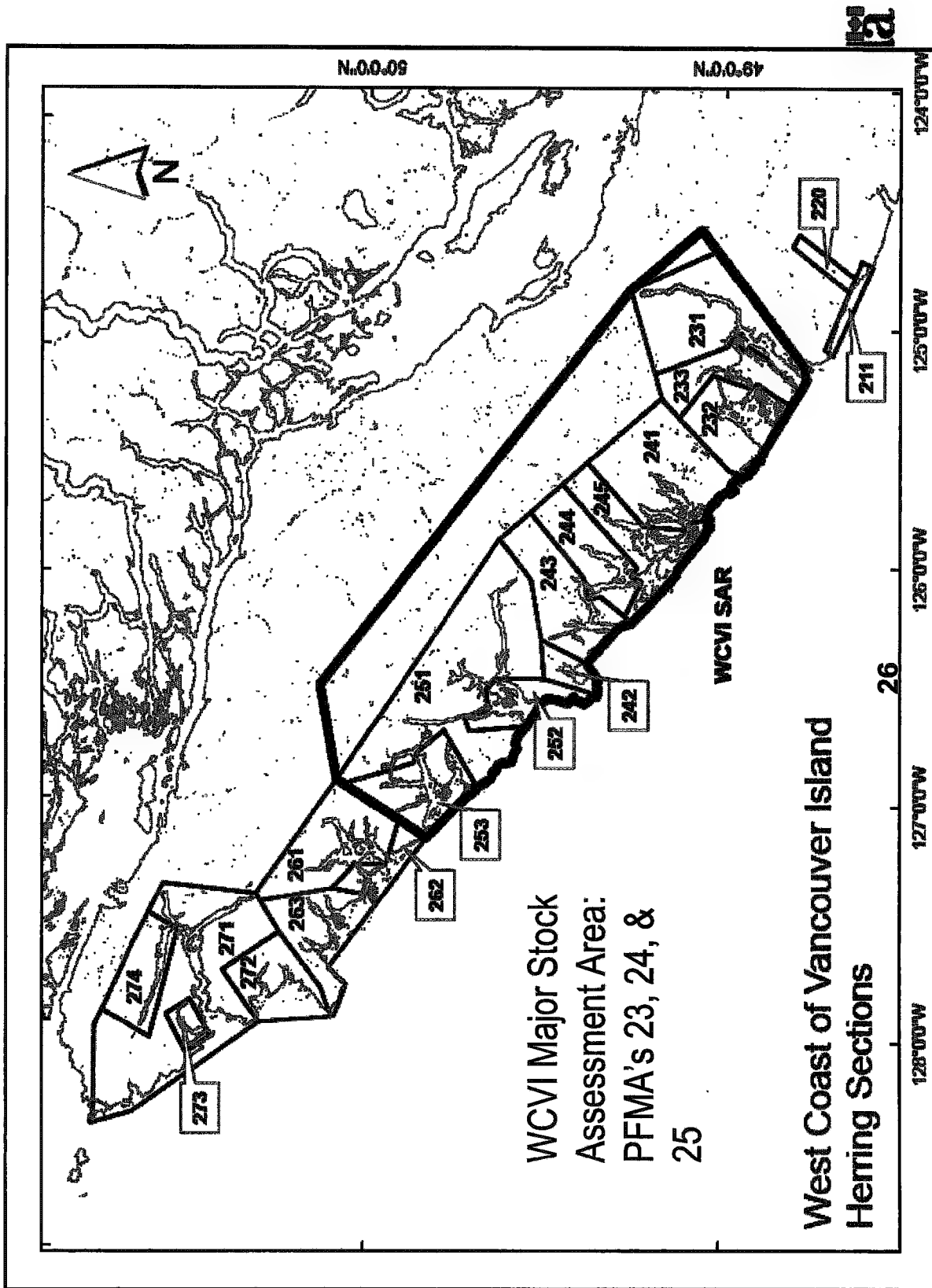
1. What should be considered when thinking about harvest planning in this area.
2. How should LRP be considered for harvest planning?
3. What recommendations would you make for harvest planning, and why?



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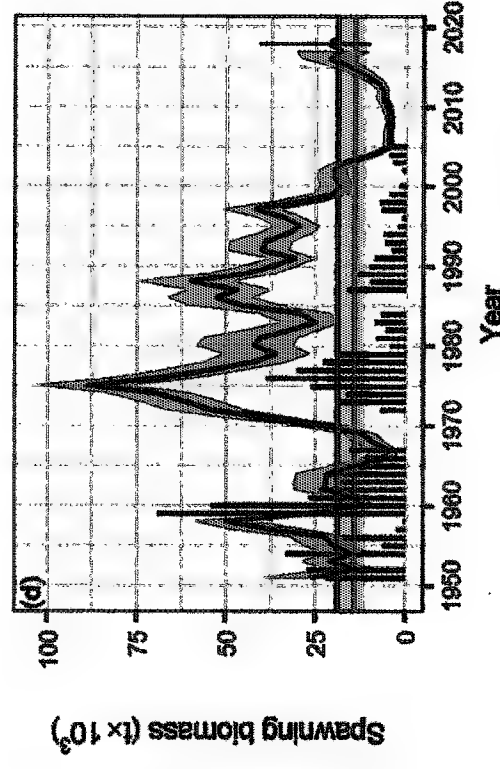
WCVI





WCVI

- WCVI no commercial fishery harvest since 2006.
- Updated production analysis: SB production is negative. In most years since 2005 WCVI has been in a LP-LB state, indicating negative stock growth. At low biomass levels, the WCVI stock is characterized by seemingly abrupt differences in year-to-year survey biomass.
- Projected pre-fishery SB_{2018} is 20,003 t (AM2), similar to SB_{2017} levels (17,742 t).
- In 2018, there is an 20% (AM2) probability the stock will be below the LRP in the absence of fishing, and a 45% (AM2) probability the stock will be below the fixed cutoff of 18,800 t.
- There is very little estimated age-2 recruitment entering the spawning population in 2017 indicating low predicted age-3 recruitment in 2018.
- Nuu-chah-nulth have recommended continued closure of WCVI for up to four more years to support rebuilding.



Canada



Key Fisheries:

- FSC
 - Area 23 - Tseshaht & Hupacasath First Nations
 - Area 24 - Tla-o-qui-aht, Ahousaht, and Hesquiaht First Nations
 - Area 25 - Mowachaht/Muchalaht, Ehattesaht, and Nuchatlaht First Nations
- Treaty Fisheries
 - Area 23 - Maa-nulth First Nations
- Commercial
 - SOK
 - Area 23/24 – 2 licences; Area 25 – 2 licences
 - No harvest since 2006
 - Roe (Seine/Gillnet)
 - Typically occurs in Barkley Sound (Area 23) and/or Esperanza Inlet (Area 25)
 - No harvest since 2006
 - T'aaq-wiihak (on-going negotiations)



Stock Assessment Resources

- Spawn flights
- 20-day biological sampling/test charter
- 15-day dive spawn charter (single team)
- 15-day shore-based dive spawn team (incl. Area 27)

DFO Management Resources

- Resource Manager – Peter Hall

Other Resources:

- First Nation's herring spawn reconnaissance surveys – funding currently unconfirmed



Area: WCVI

Key Questions for this area:

1. What should be considered when thinking about harvest planning in this area.
2. How should LRP be considered for harvest planning?
3. What recommendations would you make for harvest planning, and why?



Planning Timeline

Nov 6 to 9	HIAB: Nov. 8.IHHPC: Nov. 9.Objectives: 1. Consultation to develop the IFMP and management approach informed by CSAS stock assessment/forecast document, 2. Discussions PA compliance elements such as USR
Mid Nov	Briefing note to DM/Minister on management approach options (open areas and harvest levels) Informed by HIAB/IHHPC/FN consultation and science advice
Early Dec	Ministerial decision on management approach In season adjustment to Food and Bait quota if required. Conference call/letter to convey direction on management approach.
Dec	Release draft consolidated Pacific Herring IFMP
Early Jan	Begin licensing process for roe herring • Payment/Area selection, Area reselection, pool lists
Late Jan	Approval of consolidated Pacific Herring IFMP
Feb. 10	Roe herring licence issuance

Herring Industry Advisory Board Meeting

November 8, 2017

SFU Wosk Centre, Vancouver

Attendance:

Industry: Chris Wick, Chris Cue, Sean Halladay, Bob Rezansoff, John Lenic, Allan Marsden, Mitch Ponak, John Malcolm, Colin Smith, Brad Mirau, John Nishidate, Rob Morley, Mike Rekis, Bob Rezansoff, Josh Young, Josh Duncan, Mike Frost, Jack Groven.
Fish Safe: Ryan Ford.
JOTomas: Stephany MacNeil, Doug Tallman.
DFO: Steven Groves, Corey Martens, Andrea Goruk, Roger Kanno, Brenda Spence, Ryan O'Connell, Christine Bukta, Jaclyn Cleary, Leigh Edgar, Amber Neuman, Gabrielle Kosminder, Bill Van Egteren, Les Sanderson, Corey Martens, Peter Hall.

Handouts:

- Herring Renewal
- Herring Planning
- Science Presentation
- Herring SAR
- Waste Discharge

Presentations can be found at the following link:

https://www.dropbox.com/sh/gf1uxlvjl8usi4y/AADj0dLlmj1L0Avtu6m_34aPa?dl=0

Meeting Summary

Plenary

1. **Roe Herring Best Practices (Ryan Ford)**
 - Fish Safe is targeting completion of Roe Herring Fishery Best Practices document by February/March.
 - Planning a facilitated meeting with a small group of industry volunteers in December, potentially adjacent to next HIAB meeting.
2. **Vessel Discharge near Aquaculture Sites (Gabrielle Kosminder, Amber Neuman; see handout)**
 - Recent Norovirus outbreaks have been linked to sewage discharge.
 - The outbreaks have resulted in extended closure of shellfish farms causing substantial financial losses. This is a particular problem in Baynes Sound.
 - There is Transport Canada regulation prohibiting sewage discharge and requiring vessels to be equipped with holding tanks. TC will be enforcing regulation.
 - Vessels should refrain from discharging near farm operations and should either pump out at a shore-based waste receptacle or discharge offshore, away from farms.

- In the discussion, advisors indicated there are limited options for shore-based pump out in the St. of Georgia.

3. Herring Renewal (Brenda Spence/Jaclyn Cleary; see handout) - DFO will continue to advance the three elements of Herring Renewal.

Renewed Management Framework

- Work will continue on the components of an alternative Harvest Control Rule (HCR). Science has recommended Limit Reference Points (LRP) at 0.3 Bo and has provided options for Upper Stock Reference Points in the Science Advisory Report (SAR). Objectives will be developed and alternative HCRs simulation-tested initially on the WCVI and then the St. of Georgia in the period now to September 2018. HIAB wants to ensure industry and their representatives on the HTWG are engaged in the development of USRs, objectives, and the simulation analysis.

Management Reform

- Licence Fee Review could be linked to ITQ but no national review underway.
- A pilot mobile at sea observer program will be tested in the SOG as an alternative to on-grounds management.
- A herring Catch Monitoring Risk Assessment will be reviewed with HIAB in December.

Stock Assessment Survey

- A work plan is being developed to explore alternative stock assessment survey approaches that will make the program more cost effective.
- In the discussion it was noted that the IHHPC has repeatedly supported government funding of the current comprehensive program and that group should be consulted. It was noted that the current program has additional value to harvesters, for example, providing inseason abundance and distribution information utilized by SOK harvesters. Alternative survey options were discussed, such as using spawn length as indicator of spawn abundance, as well as, hydroacoustic techniques. In addition, options for cost recovery were discussed, such as generating funds from small commercial fisheries located in areas not currently fished. In terms of the process, HIAB wants to ensure that science representatives on the HTWG and experienced fishermen are engaged.

4. Science Update (Jaclyn Cleary; see handout)

- Herring forecasts are again presented in probability based decision tables which relate abundance to reference points in each stock area. New to this year's analysis are Limit Reference Points recommended by science at a CSAS meeting in February/17.
- In the discussion it was again noted that LRP's should not be implemented in the absence of an evaluation of a new harvest approach with simulation analysis. Further, it was noted that the recommended LRP's for PRD and SOG were flawed given the stocks did not demonstrated the required persistent low productivity levels.

- Productivity of a number of the stocks has persisted at low levels in recent years relative to higher levels observed in the 1970's and 1980's. Current policy prescribes that analyses include the full time series but this does not represent the current reality, resulting in disproportionately high reference values. It was suggested that simulations should consider lower productivity levels observed in recent years.
- It was also suggested that climate effects such as recent elevated sea surface temperatures be incorporated in the analyses.

5. Fishery Planning (Brenda Spence; see handout)

- Forecasts have again been presented for two models (AM1 and AM2) and the science advice gives no basis to choose between the two model outputs. In recent years, DFO has selected the more conservative outputs from the AM2 model; however this model is suspect given it assumes all spawns are surveyed ($q=1$).
- The new LRP's have been incorporated into Decision Tables which provide the probability of harvests reducing stock abundance below the threshold levels. DFO intends to utilize the LRP's in harvest planning for this year and the key issue for planning is how they are utilized. If the PA requirement to avoid the LRP at high probability (75-90%) is applied, fisheries in this year will be limited or curtailed in all areas except SOG and will likely be heavily constrained in the future.
- Stock Trends
 - HG – Stock remains at low abundance and all indicators are trending low, therefore, no fishery surplus is available in the upcoming year.
 - PRD – The spawning biomass has been stable, production positive, and abundance is projected to remain stable at a level somewhat above the LRP.
 - CC – Spawning biomass has been increasing over the last 5 years because of positive stock production and declining natural mortality, but spawn abundance declined in 2017. Abundance is projected to remain at a level well above the LRP.
 - SOG – Spawn abundance has been increasing since 2010 but declined in 2017. Abundance is projected to remain high at a level well above the LRP.
 - WCVI – Spawn abundance increased over the last five years but declined in 2017. The stock is projected to decline in 2018 but remain at a level somewhat above the LRP (the LRP for WCVI is well below the fixed cutoff).
- Food and Bait fishery – The 100 Ton allocation for Charity was not approved so an alternative licensing mechanism will be required. Charity sale is expected to be December 6/17.
- Timeline – Ministerial decision on the management approach is anticipated in early December and the draft IFMP will be finalized shortly after. The roe licensing process is expected to begin in early January.

Caucus Report

1. HIAB recommendations regarding Herring Harvest Planning for 2017/18

DFO has asked for industry considerations related to harvest planning, advice about how to use the newly recommended Limit Reference Point (LRP), and harvest recommendations for the upcoming year. In the discussion, HIAB indicated the following:

- The Science Advisory Report (SAR) contains stock status and forecast data but the information is complex and probability based so does not provide the basis for prescriptive quota recommendations.
- The SAR contains outputs from two assessment models (AM1 and AM2) but a sensitivity analysis provided no basis to choose between the models. However it is likely that AM2 is biased low because the assumption of $q=1$ is clearly not reality and that the true stock abundance is likely larger than the AM2 projections. Harvest planning should be based on unbiased stock abundance estimates, and harvest control rules and cut-offs should not be made ultraconservative by taking the most precautionary assumption, model, or number that would multiply layers of conservatism.
- The SAR also contains Decision Tables which relate stock forecasts to two threshold levels, a fixed cutoff and the new LRP. The use of probability based Decision Tables requires objectives that are similarly defined, that is, the probability of meeting or exceeding some goal/objective. These do not exist for herring. In addition, the LRP's in and of themselves are not objectives and CSAS science advice was clear that developing measurable objectives and testing how alternative management procedures (including reference points and harvest control rules) meet the various biological, social, and economic objectives is necessary before changes to the management approach should be considered.
- The management approach and harvest rules should not be changed without these analyses, therefore we recommend DFO use the currently approved harvest control rules to determine TAC's for each Management Area.
- The SAR contains indicators of stock status trends including, spawn abundance and modeled stock abundance, recruitment, natural mortality, and production. For Haida Gwaii, this information indicates the stock remains at low status and HIAB does not recommend a fishery here. In contrast, stock trends in the other four areas are generally positive and abundances are at sufficient levels to support some level of harvest.
- Specifically with respect to PRD and SOG, the LRP's for these two stocks were not determined by analyzing the data and identifying a "sustained period of low biomass and low productivity". To the contrary, particularly for PRD, there is no recent period that matches this definition of an "undesirable stock status". Evidence shows that PRD stocks have been stable and increasing (and showing good productivity) at levels at or below 0.3 B_0 while sustaining reasonable levels of fisheries.

- The herring fishery is extremely important to the viability of B.C. fisheries and industry objectives relating to harvest levels and access to fishing areas need to be considered in harvest planning. The industry needs reasonable fishing opportunities in as many management areas as possible to limit risk and sustain market access. The industry will provide more specific advice about quotas for each of the areas when DFO makes TACs available. Note that market demand is an important consideration and that the industry has often recommended quotas less than the TAC available in an area.
2. Expected Use - Catch allocations may be limited therefore it will be important to take advantage of all opportunities. In PRD, the 130 Ton Special Use allocation is not used and should be removed.
 3. Catch Monitoring – The HIAB CM subcommittee will meet in December to review the Risk Assessment for roe.
 4. ITQs/Licence Fees – The Seine sector has an interest in exploring an ITQ option if it provides a mechanism to reduce licence fees.
 5. Renewed Management Framework
 - HIAB participation in the process to simulation-test alternative management approaches on the WCVI and SOG.
 - Simulations should consider the current low productivity regime and the impact of a warming marine climate.
 - Upper Stock Reference Points – There wasn't time to discuss options for UCR's so the issue was deferred to next meeting.
 6. Updated Stock Assessment Program – It's recommended a small group of experienced fishermen, as well as technical representatives on the HTWG, be included in the review of the survey program.
 7. Next Meeting - when decision on herring management approach is announced, currently anticipated in early December.



Integrated Herring Harvest Planning Committee Post-Season Meeting May 1, 2019, Nanaimo, BC

Canada

IHHPC Meeting Objectives - May 1

- Review previous action items
- Review of and update to IHHPC Terms of Reference
- Review of 2018/2019 Pacific Herring fisheries
- Discuss key initiatives and process to inform planning for 2019/2020 and beyond
- Provide an update on Pacific Herring Renewal and MSE and planned work

Agenda

TIME	TOPIC	PRESENTER/LEAD
9:00 – 9:15AM	Arrive and welcome	
9:15 – 10:00AM	Introductions, review of agenda and meeting objectives Review and update of IHPC action items	B. Spence
10:00 – 10:30AM	Terms of Reference	All
10:30 – 10:45AM	BREAK	
10:45 – 11:30AM	Pacific Herring Renewal – Management Strategy Evaluation (MSE) update and planning	J. Cleary
11:30 - 11:45AM	Overview of 2018/19 timeline and communications	B. Spence
11:45AM – 12:30PM	LUNCH (cafeteria on site; cash only)	
12:30 – 2:30PM	Area-based post-season review- activities and fisheries <ul style="list-style-type: none"> • WCVI • SOG • CC • Area 10 • PRD (Big Bay & Kitkatla) • HG 	Area Managers
2:30 – 2:45PM	BREAK	
2:45 - 3:00PM	Conservancy Hornby Island presentation	G. Scott
3:00 – 3:30PM	Questions on DFO initiatives and priorities (provided in deck)	B. Spence
3:30 – 4:00PM	Review action items and next meeting dates	B. Spence
4:00PM	Meeting adjourned	

Review and Update of IHHPC Action Items: **Completed**

- ✓ DFO to distribute spawn timing graphs and qualify survey program used
- ✓ DFO to update objectives and MSE section in IFMP
- ✓ DFO to distribute fishery risk assessments
- ✓ DFO to provide *V. cholera* information and risk assessment
- ✓ DFO to provide link to BCCDC Norovirus findings report (provided in IFMP) and list of participants (provided in report)
- ✓ DFO to include additional objectives (social, cultural) discussion in future MSE presentations

Review and Update of IHHPC Action Items

Completed

- ✓ DFO to report on the incorporation of illegal or unreported catch into risk assessments and update on national risk assessment policy
 - Currently not incorporated – focus on established fisheries
 - National risk assessment policy to be finalized in June
- DFO to outline of MSE plan (to be presented today)
- Kitasoo to provide their management plan to DFO
- DFO to provide contact information to IHHPC re: kelp harvest/province of BC

Review and Update of IHHPC Action Items

Ongoing/Incomplete

- DFO RM to work on gathering information on Offshore AOI process and effect of seamounts on herring migration: No current research examining this. Feedback and questions on MPA through consultation process.
- DFO Science to provide information to IHHPC on dive requirements, certifications, opportunities for funding outside DFO: Ongoing - information provided on this to several nations (A-Tlegay, Heiltsuk, Metlakatla)
- DFO to provide information on research being done on green crab predation on herring spawn: No current research examining this; green crab work not during herring spawning season

Review and Update of IHHPC Action Items

Ongoing/Incomplete

- DFO to include electronic link of Kitasoo management plan in IFMP – not completed, timing
- Kitasoo and DFO to continue aging work for Kitasoo management plan – carry forward?
- **DFO to pursue SOK transferability issue** - update today
- **IHHPC to revise Terms of Reference** - underway

SOK Transferability (Nomination) Review

Few Pacific Region fisheries where nomination is not permitted (e.g. intertidal clam, scallop by trawl)

- Nomination when a party-based license eligibility is assigned from one party to another party.
- Fishing area changes would not be in scope of review, only nomination.
- Communal commercial (FJ) licenses would not be in scope, as they are provided to First Nations through AFS agreements.

Next steps and considerations:

- First Nations and license holder consultation needed to inform options/considerations
- SCOFO: Regulation of the West Coast Fisheries- recommendations may impact licensing changes (June 2019)
- Confirm IHPC membership in a Nomination Working Group to and development of consultation materials

IHHPC Terms of Reference

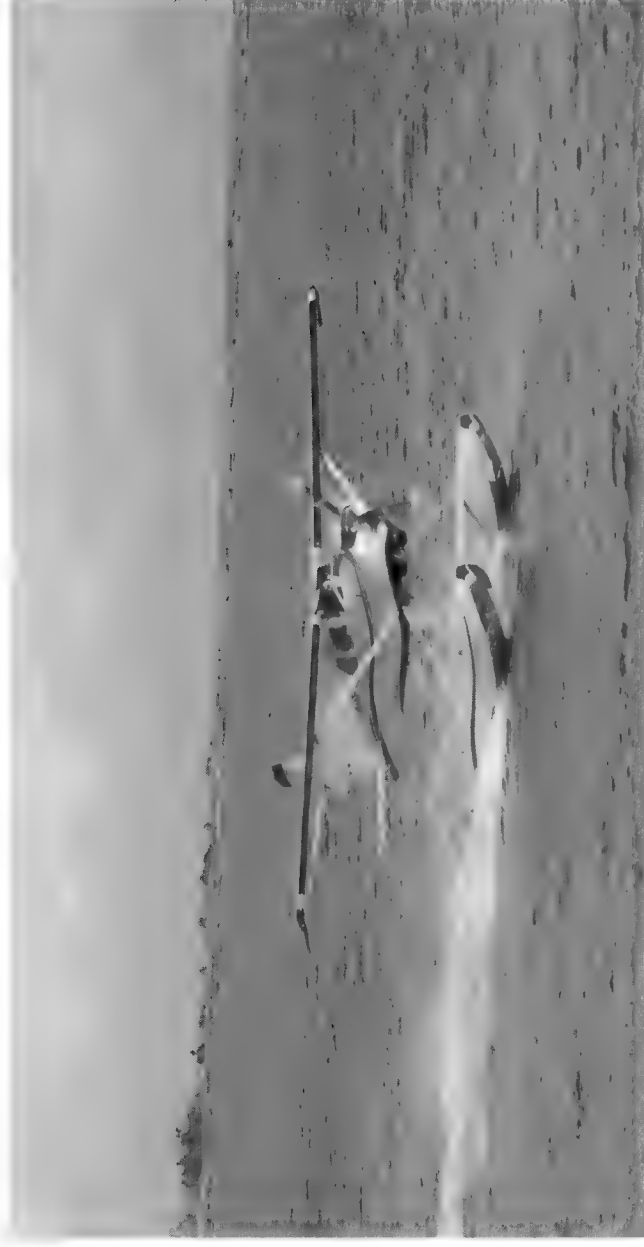
- TOR had not been updated for many years and not as per the prescribed schedule
- Distributed draft TOR updates for comment March 5, and again April 12, 2019
- Review of TOR changes
- Discussion on process to apply to IHHPC moving forward

IHHPC Terms of Reference

PREVIOUS	REVISED	RATIONALE
One First Nations rep per stock area	A list of First Nations who typically participate	One rep per area is not able to represent/provide Area First Nations views or TEK
Three year TOR	TOR term not specified	Term not adhered to, to be updated if/when required
Membership types not defined	Membership types defined (SME, observers etc)	Clarity on roles and participation
Number of reps per sector	Reps identified not by sector	Broad representation helpful for information and process
Members of public did not have way into IHHPC planning processes	One SoG area rep for the broader coastal communities	Large population, significant fisheries, and interest in process

15 minutes

BREAK



Jaclyn Cleary

PACIFIC HERRING RENEWAL/MSE UPDATE

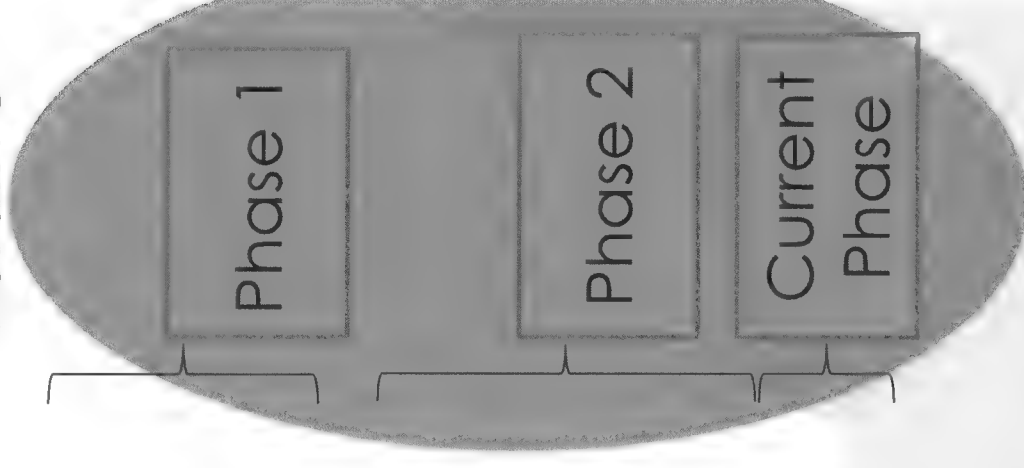
Summary of MSE Process

- Provides opportunity for First Nations and stakeholder objectives to be formally considered in the decision-making process.
 - Transparent longer-term decision making process.
- MSE simulations project over a time horizon appropriate to species life-history due to feedback simulation (e.g., 3 species generations).
 - Robust to uncertainty and identifies risk, with scheduled re-evaluation

Key Steps in the MSE Process

1. Define decision context
2. Define management objectives and performance indicators (including LRPs, USRs)
3. Identify set of Management Procedures (MPs)
4. Define set of Operating Models
5. Simulate MP performance
6. Rank overall MP performance
7. Apply MP to the real fishery

Iterative



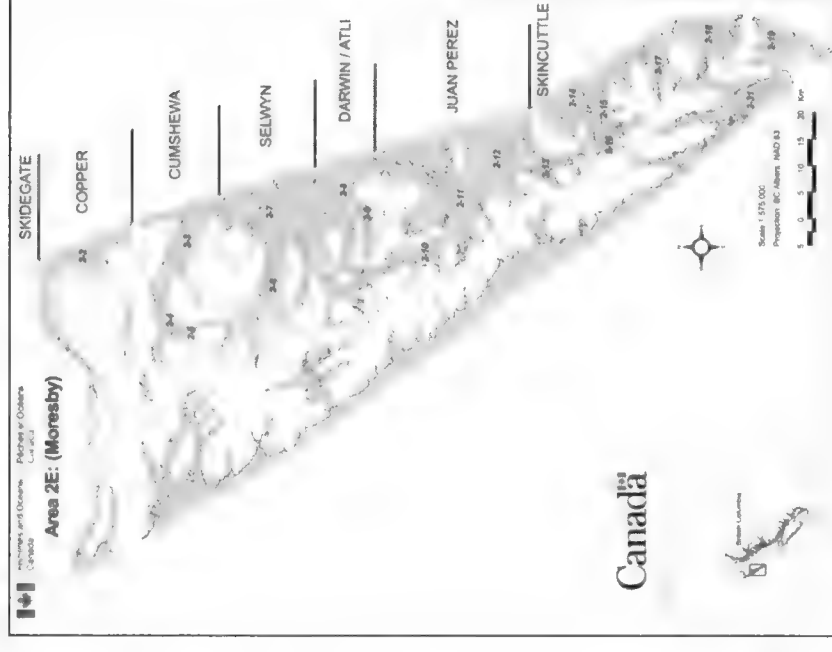
Learn, repeat, revise – make system better, not worse

Management Strategy Evaluation

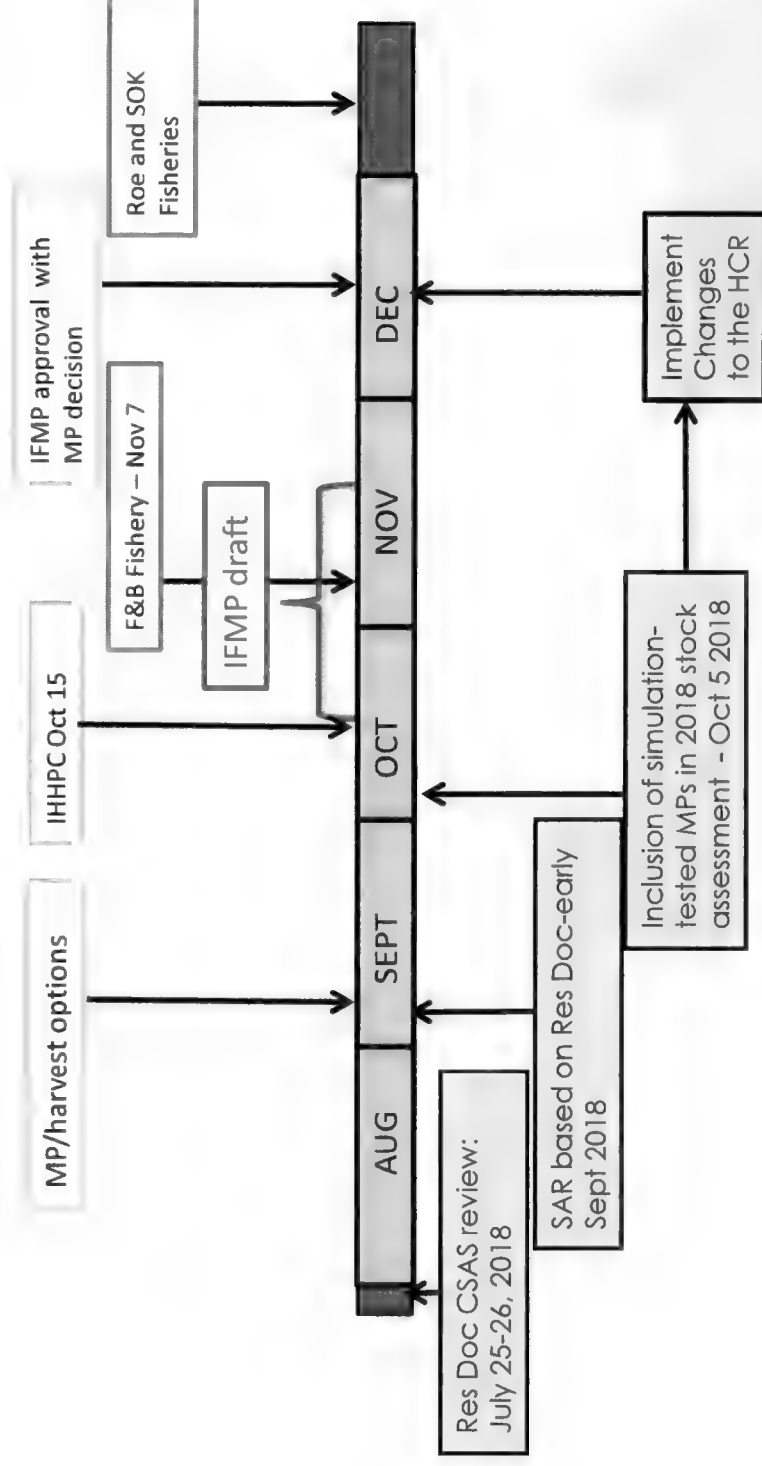
- Cycle 1: Simulation evaluations and application of MSE results for SOG and WCVI
 - Completed: July 2018 CSAS; work completed Sept 2018
- Cycle 1: Simulation evaluations and application of MSE results for PRD, CC, HG
 - Simulations to be presented as a Science Response (July 2019)
 - Results to be included in 2019 stock assessment (Sept 2019) and applied for 2019/20
- MSE Operating Model update (add SOK and fleet dynamics, changes to M, add some spatial dynamics)
 - Development will focus on HG/WCVI; with application to other stocks. CSAS review of OM changes in December, 2019
- HG Rebuilding Plan
 - Work underway, due Dec 2020

Haida Gwaii Herring Rebuilding Plan

- Rebuilding Plan to be completed for Dec 2020
- Haida-DFO Technical Working Group: Terms of Reference, Scoping Document, Workplan near completion
- HG simulation evaluations for July 2019 (MSE cycle 1)
- December 2019 CSAS
- Request from Rebuilding Plan WG for HG herring closure until plan complete – under review



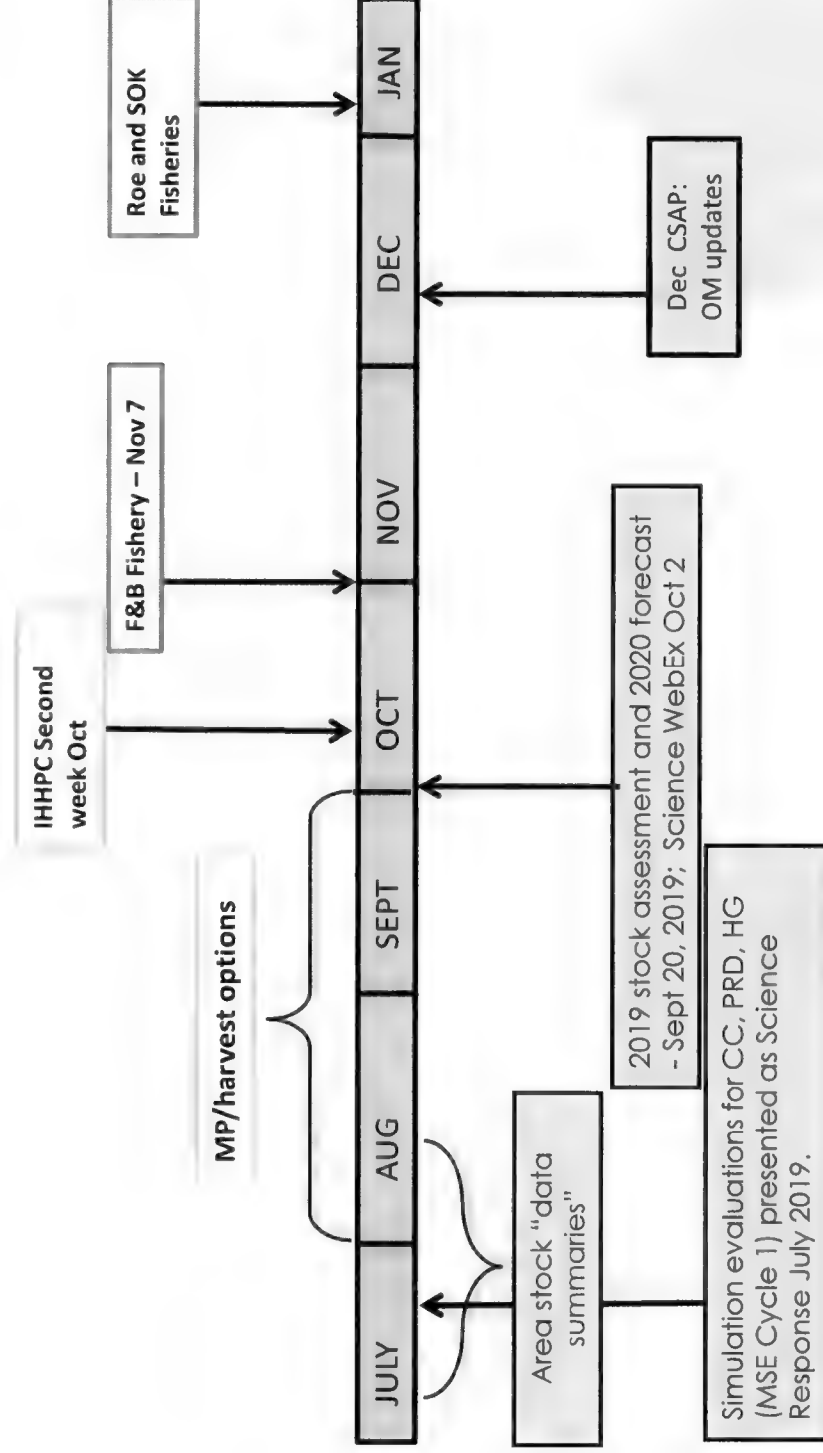
2018 Plan: Key Dates/Decision Points



2018/19 Key Dates

Date	Meeting/Decision
Sept 20	Pre-Season Planning Meetings with IHHP and HIAB
Sept 26 - Oct 25	Consultation Period for Food & Bait/Special Use plans
October 10	2018 Stock Assessment and 2019 Forecast webinar with IHHP
October 17 / 19	Pre-Season Meetings with IHHP and HIAB
Nov 5	Food & Bait and Special Use Commercial Fishing Plans approved
Nov 7	Food & Bait and Special Use fisheries open
Nov 28	Ministerial decision on 2018/19 management approach
Nov 29 / Dec 5	Review of management approach with HIAB and IHHP
Dec 7 - Jan 9	Consultation period for full IFMP
Feb 6	Pacific Herring 2018/19 IFMP approved
Feb 12 / 15	Food and Bait/Special Use fisheries Close
March 9 - 15	Roe seine fishery - SOG
March 15 - April 4	Roe gillnet fishery - SOG
March 19 / 22 / 25	SOG fishery openings
May 1 / 2	Post-Season Meetings with IHHP and HIAB

2019 Plan: Key Dates/Decision Points



2019/20 Meetings Planned

Date	Meeting/Decision
May 1/2	IHPC and HIAB Post-Season Meetings
May 10	Aquaculture-Herring Notovirus Dialogue Meeting
May 23	Maa-Nulth Post-Season Review Meeting
May 28/29	MSE Objective and Fishery Planning: Metlakatla, Lax Kw'alaams, Kitkatla First Nations
May/June (tentative)	Central Coast Nations MSE Meeting - placeholder
May/June (tentative)	Strait of Georgia Nations MSE Meeting - placeholder
May/June (tentative)	Nuu-Chah-Nulth MSE Meeting - placeholder
May/June (tentative)	HIAB MSE Meeting - placeholder
June 11	Conservancy Hornby Island/Association of Denman Island Stewards/Pacific Wild Meeting
June 19	IMAWG Strategic Planning Workshop and Annual Governance Meeting; Discussion of Annual Planning Priorities
July 10/11	Haida Gwaii Rebuilding Plan Working Group Meeting
July (tentative)	Area 10 Post-Season Review and 2019/20 Planning Meeting - placeholder

2019/20 Meetings Planned

Date	Meeting/Decision
August (tentative)	Individual Area Stock Summary Review and Early Advice Calls – placeholder (multiple)
September 20	Science Response for CC, PRD, and HG with MSE Cycle 1 results
October 1	Webinar with IHGPC/HIAB to review Science Response Herring Post-Season Week
October 7-10 - Proposed	October 9: HIAB October 10: IHGPC
October (tentative)	Conservancy Hornby Island

~Discussions on schedule or process~

Herring Communications: 2018 and 2019

- More than 100 letters received, with a focus on the roe fishery in SOG
 - First Nations
 - Commercial Industry and harvesters
 - Conservancy groups
 - Public, recreational harvesters, local residents
- Online petition with >80,000 signatures
- DFO conducted numerous interviews and communications with various media sources

What We Heard

- Support for continued MSE work
- Area or coastwide stocks are in low state and do not support commercial fisheries
- FSC needs are not being met due to low or poor distribution
- Public comment period inaccessible as it falls over the holiday
- The impacts of fisheries on local populations and the broader ecosystem need to be better understood
- The stock assessment uses a biomass baseline that is a fished state(not historic levels)

What We Heard (cont)

- Roe fishery provides employment and supports coastal communities
- Roe herring provides jobs and stimulates the economy
- The current stock assessment results support and allow for commercial herring fisheries in the SOG and other areas.
- Decisions should be science based
- Limiting fishery access does not allow for economically viable fisheries. A need for multiple areas and subareas.

What We Heard (cont)

- Roe is not the “best use” of the fish – herring should be left in the water as forage fish for other species (chinook, whales, seabirds)
- The roe fishery is a “reduction” fishery
- The roe fishery does not provide as great an economic benefit as other industries (salmon fishing, tourism)
- Commercial fisheries have reduced populations of herring coastwide so the last remaining large stock should not be fished

Information Provided

- DFO conducts a comprehensive annual stock assessment program to determine herring stock status and sustainable harvest levels
- The maximum 20% harvest rate in SOG:
 - leaves 80% of mature fish and juveniles available to support future herring populations and ecosystem processes
 - has been tested by the Management Strategy Evaluation process to date
- The Strait of Georgia supports high densities of many marine mammals which are key components of a healthy and productive ecosystem.

Information Provided (cont)

- While the Roe fishery is exempted from the Fisheries Act, (which prohibits the harvest of fish for use in fish meal and fertilizer), the primary product is the roe which is extracted for human consumption. Herring carcasses may be rendered for other uses as with by-products of other commercial fisheries.
- DFO does not control or regulate markets or the economics of fisheries, and instead applies the best available Science to set quotas that will meet stock conservation objectives over time.
- Areas that have seen low spawn levels in recent years were closed to year to ensure that fisheries are not opened on small areas of spawn and prioritize FSC harvesting

Successes, Concerns, and MSE

- There has been much work done and progress/support made on MSE
- Yet concerns regarding effective management not fully addressed.
- What further steps or approaches can be undertaken within existing resources to improve information and herring management?



45 minutes

LUNCH

FISHERY/AREA REVIEWS

South Coast Staff

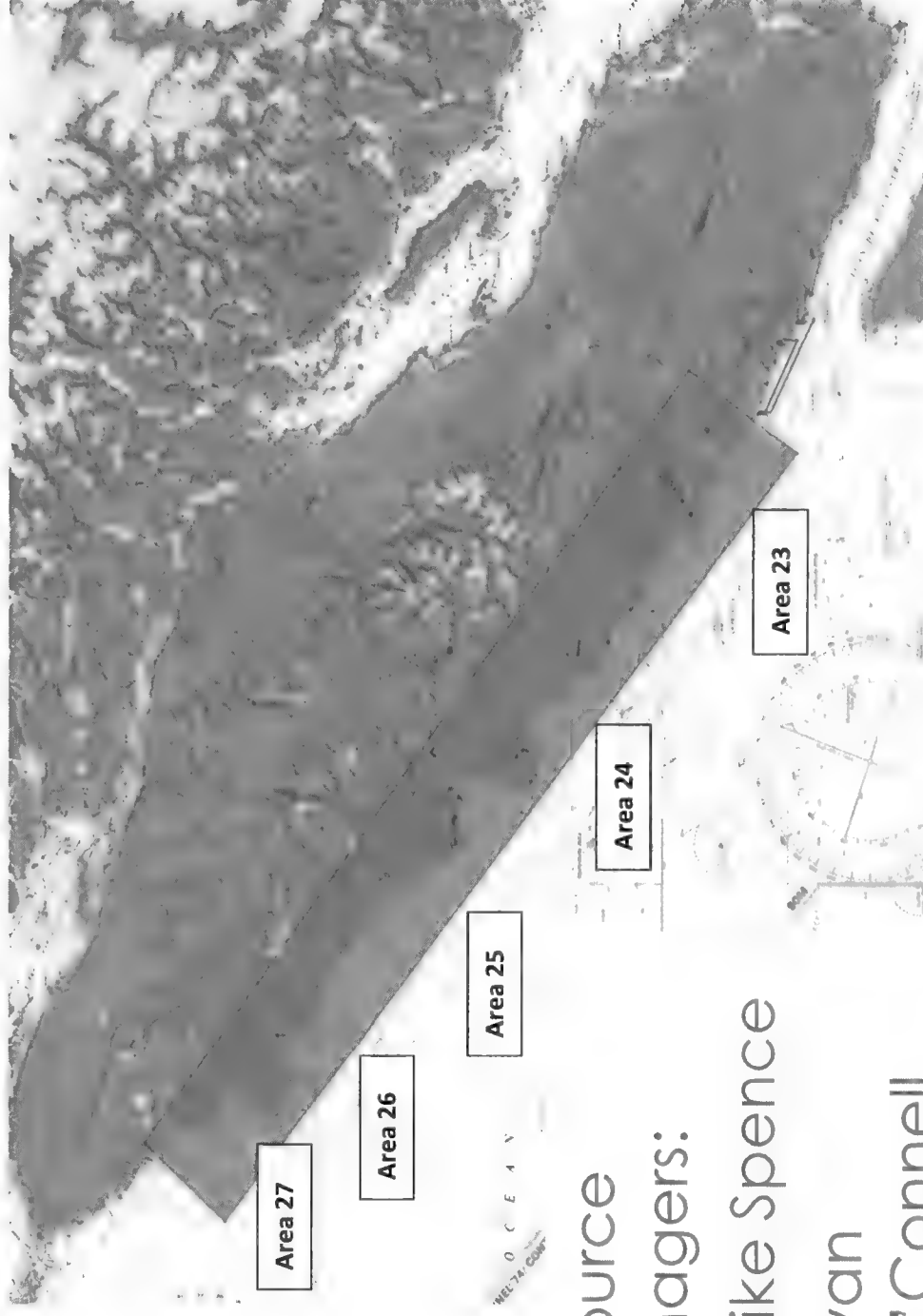
- WCVI
- SOG

North Coast Staff

- CC
- Area 10
- PRD (Big Bay &
Kitkatla)
- HG



Stock Assessment Area – WCVI, Areas 23-27



Resource Managers:

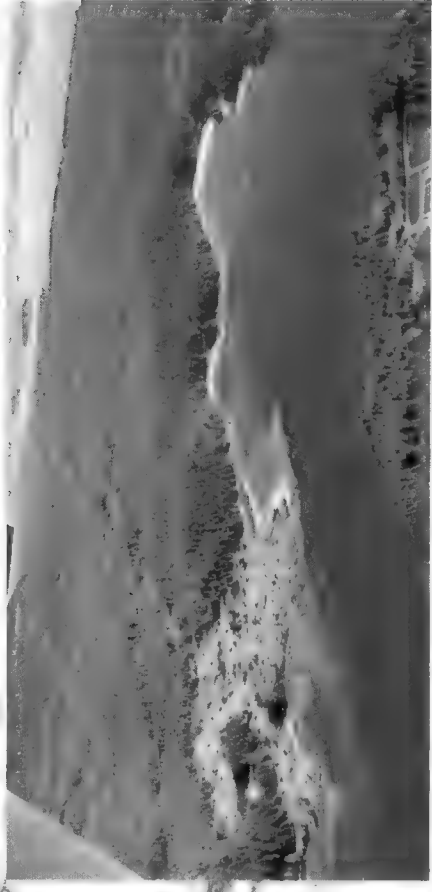
- Mike Spence
- Ryan
O'Connell

WCVI - Harvest Decision Context

- Low biomasses and low growth rates have persisted in most years since 2005, despite fishery closures during that time
- The Nuu-chah-nulth Nations have recommended a complete commercial fishery closure for this area for 4 years.
- Not opened to support continued stock rebuilding

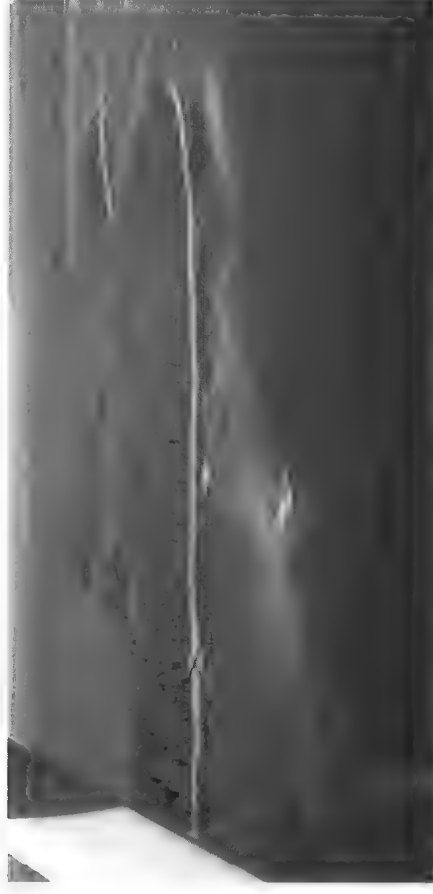
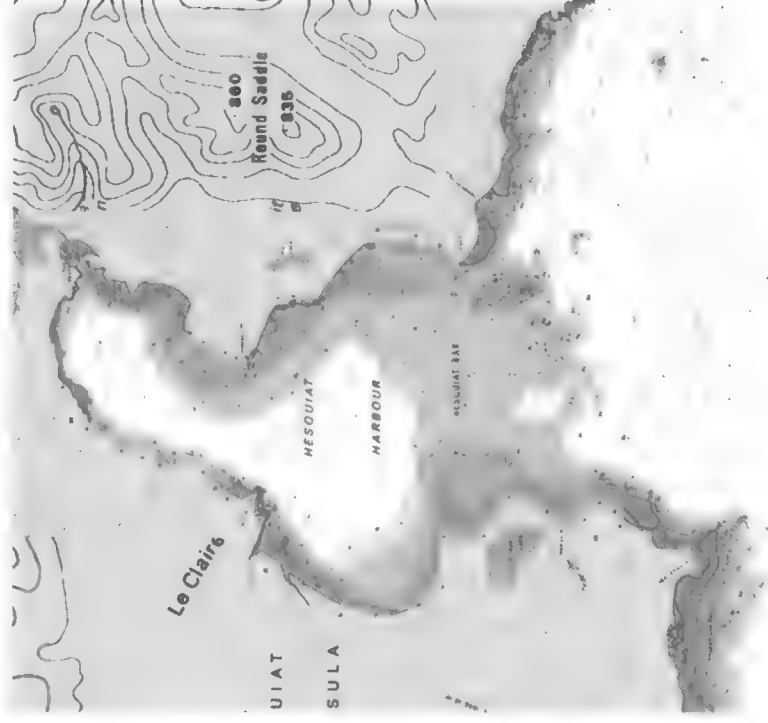
Area Resources

- Test vessel:
 - Proud Canadian - 20 days
- Dive charters:
 - Vessel Based: Pachena No.1 – 20 days (1 day extension)
 - Shore Based: Seaveyor 1 – 15 days (combined with SOG)
- Spawn aircraft flights: 10
- Sattellite imagery project 2018 and 2019 images
- First Nations reconnaissance surveys:
 - Area 23 – 15 days ([REDACTED] , Toquaht FN)
 - Area 24 – 29 days ([REDACTED] , Hesquiaht FN)
 - Area 25 – 16 days ([REDACTED] , MMFN, [REDACTED] , Nuchatlaht Tribe (Esperanza); ([REDACTED] , NTC)



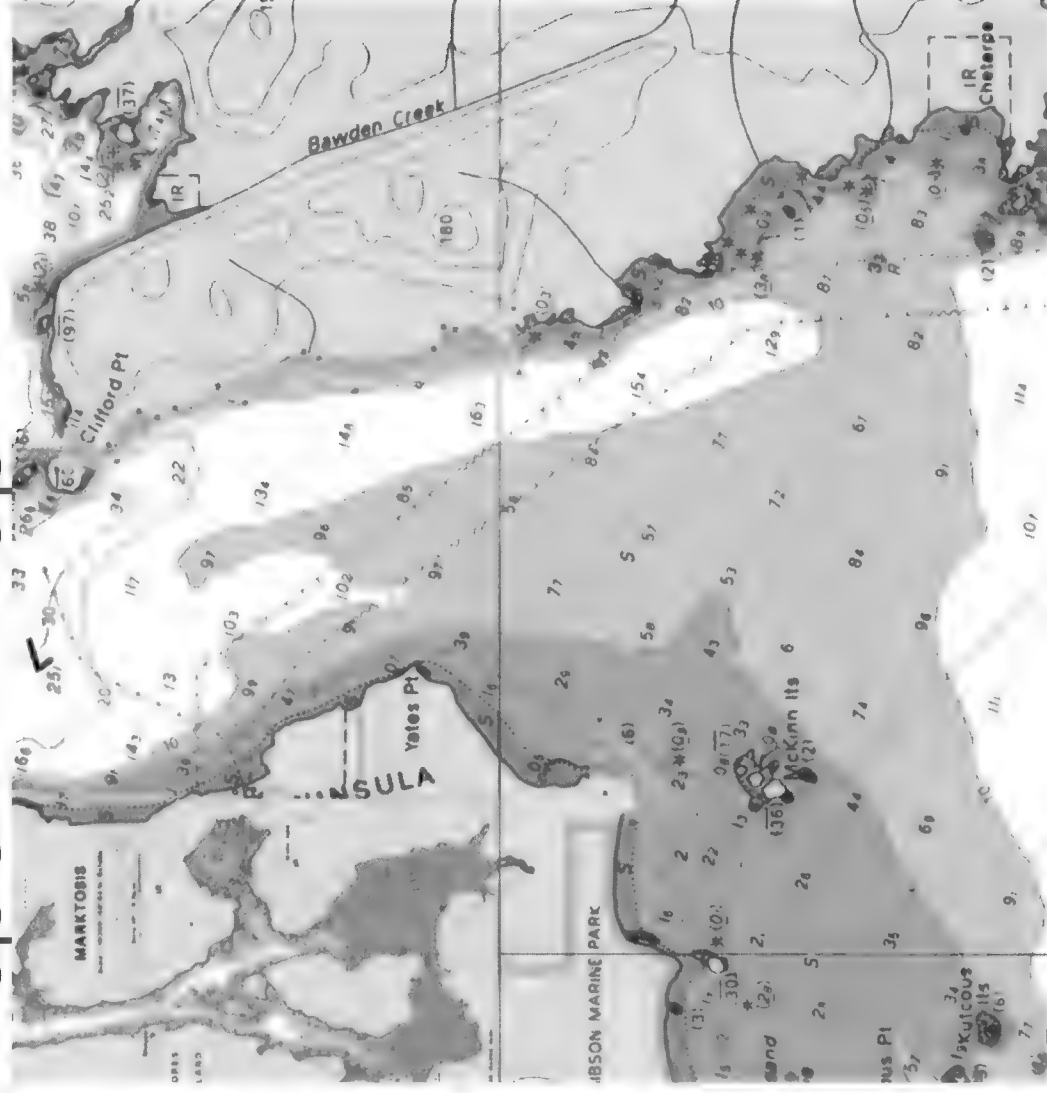
- 34

Area 24 Spawn Map

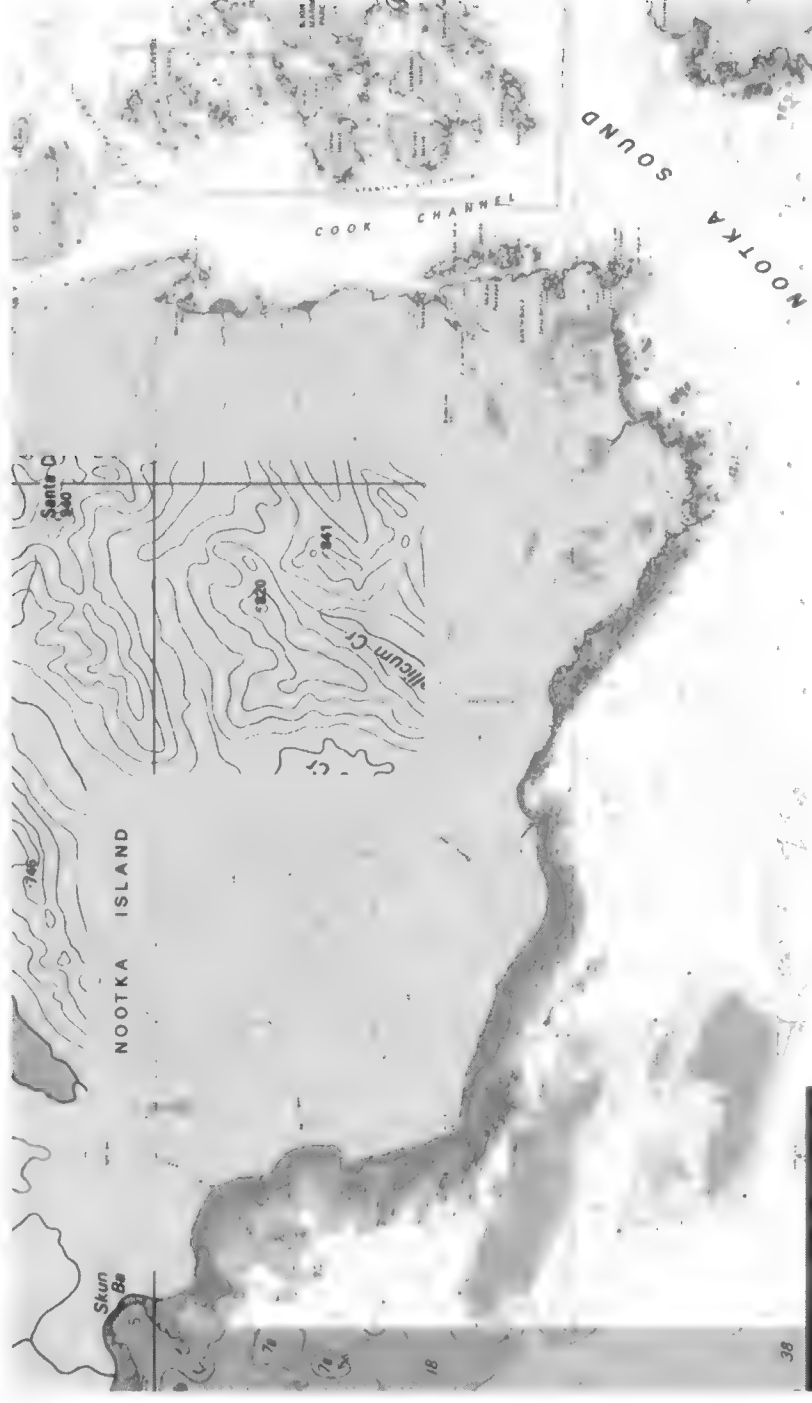


- Jan 15 – Mar 29 (7 days)
- 3 samples - seine test
- 4000 tons sounded
- 9.4 miles (spawning activity)
- Vessel dive survey

Area 24 Spawn Map

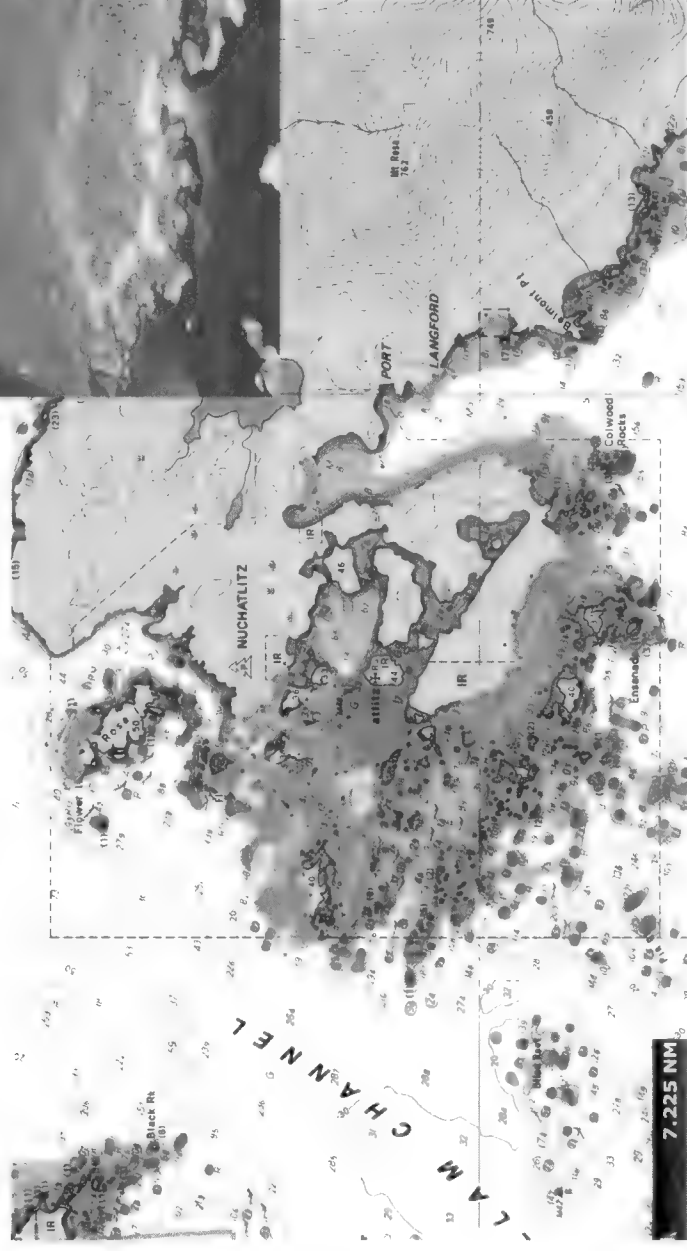
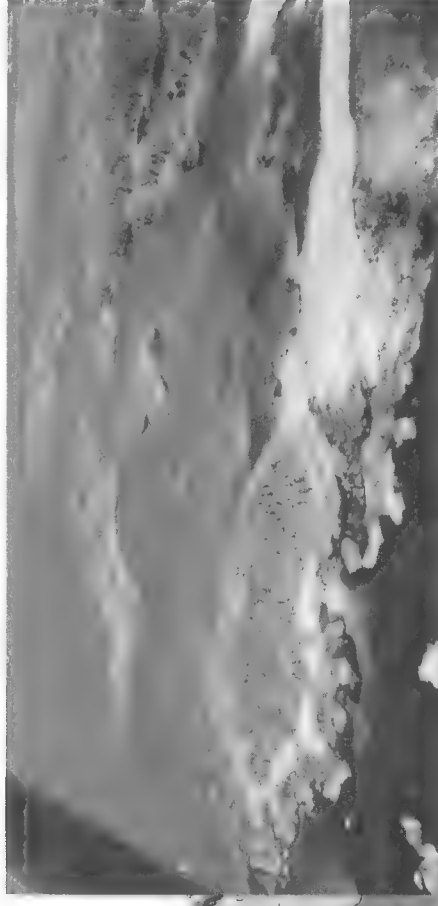


Area 25 - Nootka



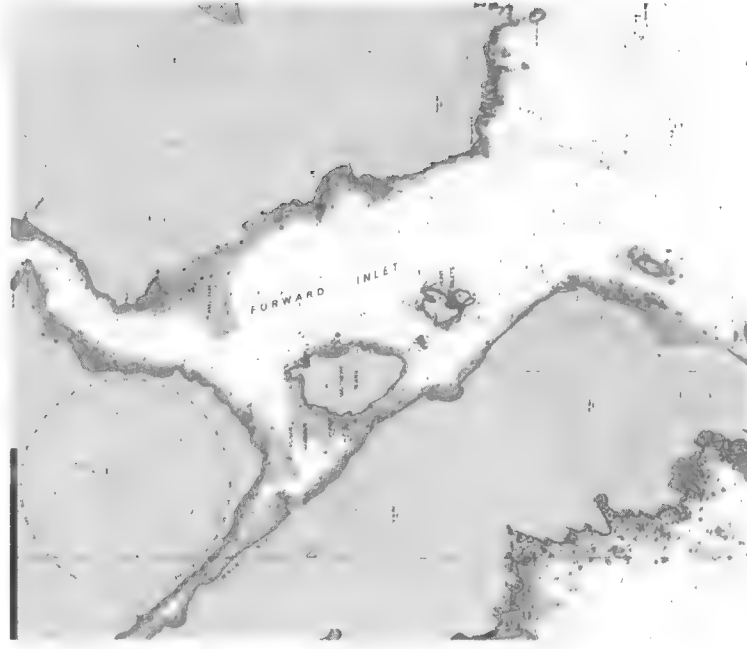
- Mar 5 – Mar 16 (7 days)
- 9200 tons
- 8.01 miles (spawning activity)
- Vessel & Shore based dive survey
- 5 Seine test samples
- Later fish sounded Mar 20 no spawn reported

Area 25 - Esperanza



- Feb 28 – Mar 27 (8 days)
- 2800 tonnes
- 7.2 miles (spawning activity)
- Vessel based dive survey
- 3 Seine test samples

Area 27 Spawn Map



- Mar 20 – Mar 28 (2 days)
- 2.3 miles (spawning activity)
- Shore based dive survey
- Dive survey reported mass die off of eggs

WCVI - Fisheries

FSC

- Area 23 - Tseshaht & Hupacasath First Nations
Area 23 - Maa-nulth First Nations Treaty Fisheries
- Area 24 - Tla-o-qui-aht, Ahousaht, and Hesquiaht FN
- Area 25 - Mowachaht/Muchalaht, Ehattesaht, and Nuchatlaht FN
- Total of 3000 pounds of round herring reported harvested by WCVI First Nations.
- Spawn on boughs and trees activity reported in Area 23 & 24 with poor success.

Commercial

SOK Area 23/24 – 2 licences; Area 25 – 2 licences No harvest since 2006

Area 27 – 3 licences - did not set up- no harvest

Roe (Seine/Gillnet): No harvest since 2006

T'aaq-wiihak (on-going negotiations)

Strait of Georgia

Resource Managers

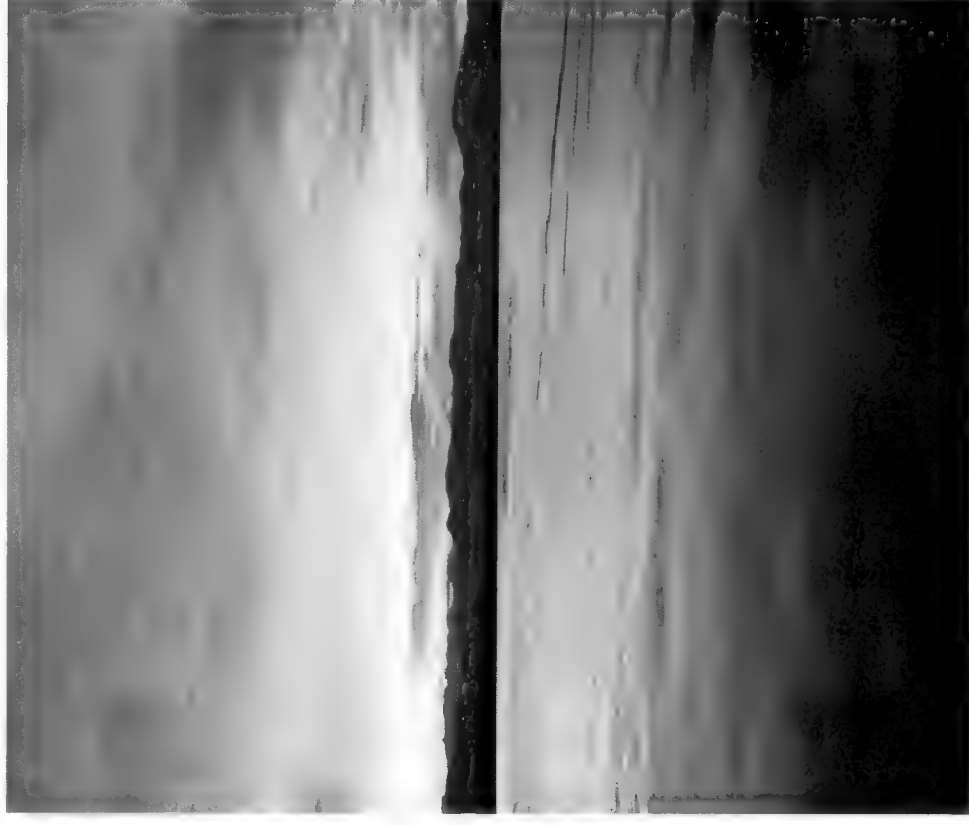
Seines:

Bryan Rusch

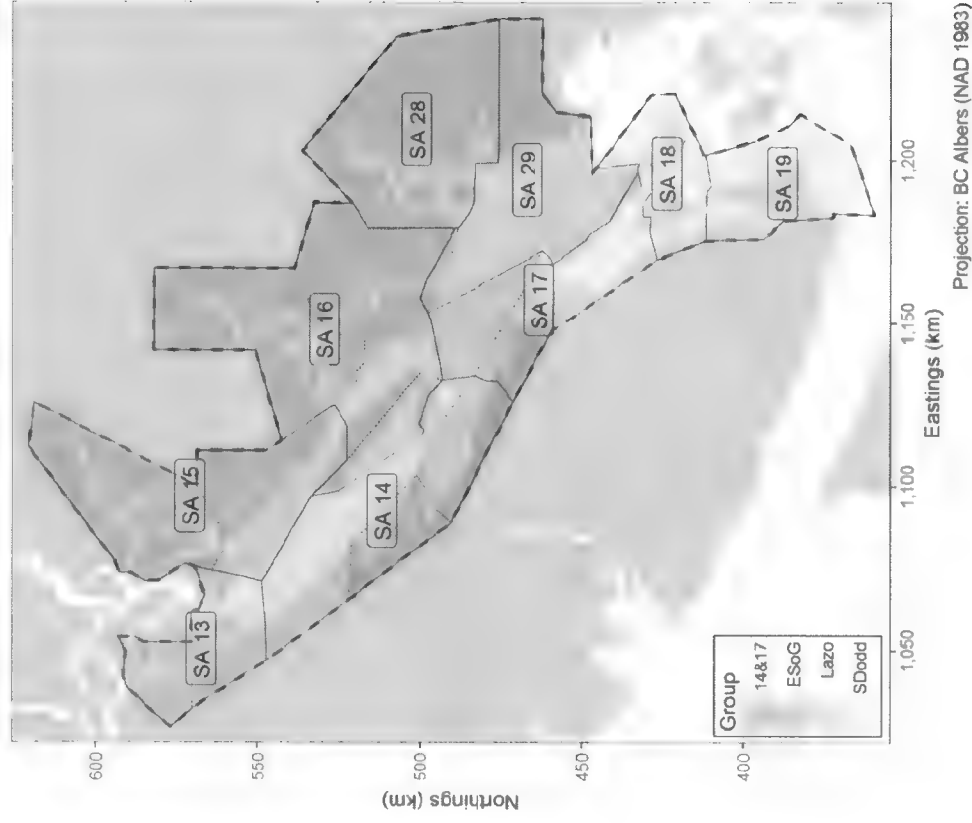
Amber Neuman

Gillnets:

Terry Palfrey



Stock Assessment Area – SOG

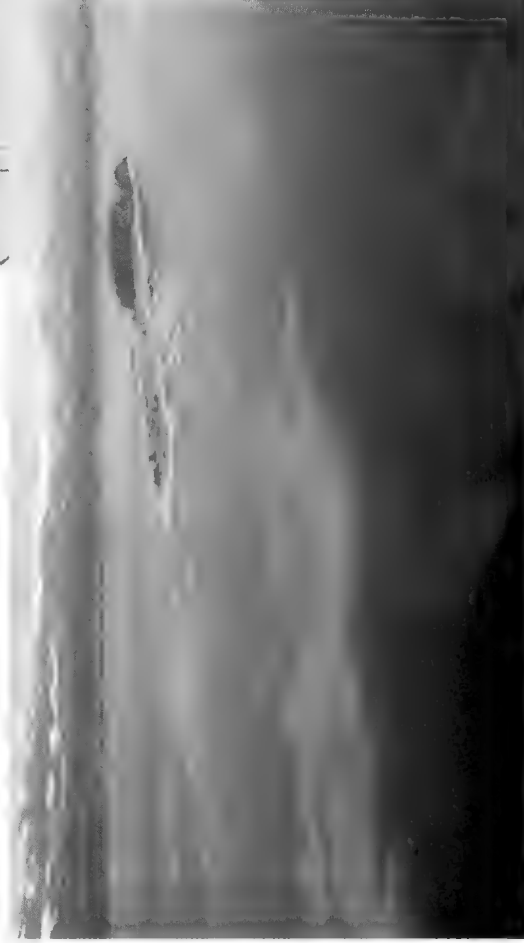
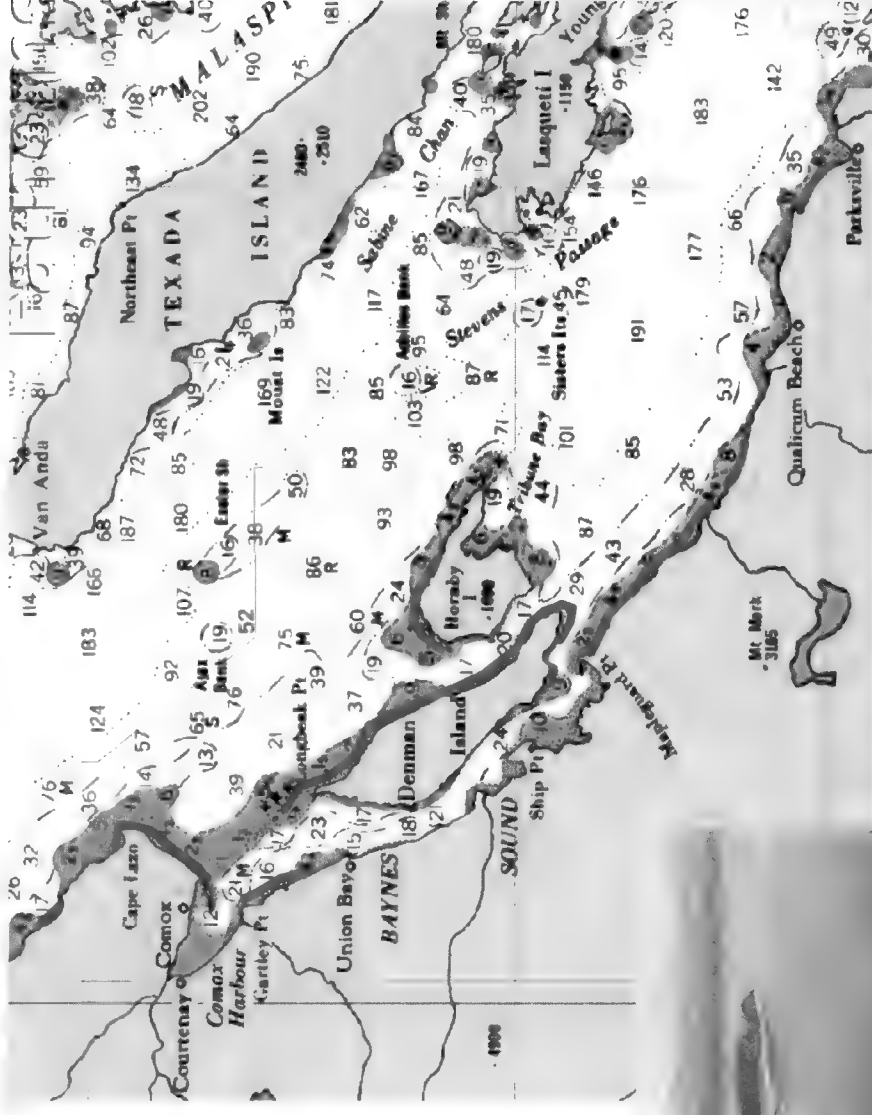


Harvest Level Decision Context - SOG

- Food and Bait, Special Use, and Roe herring opportunities, to a maximum of 28,430 tons.
- 2019 spawning biomass forecast to be 135,497 tons and below the LRP with a 0% probability in the absence of fishing.
- Stock biomass is high and growth is positive.
- Catch level based on application of a management procedure selected through the Management Strategy Evaluation (MSE) simulation evaluation process and applies a 20% harvest rate and 30,000 ton catch cap.

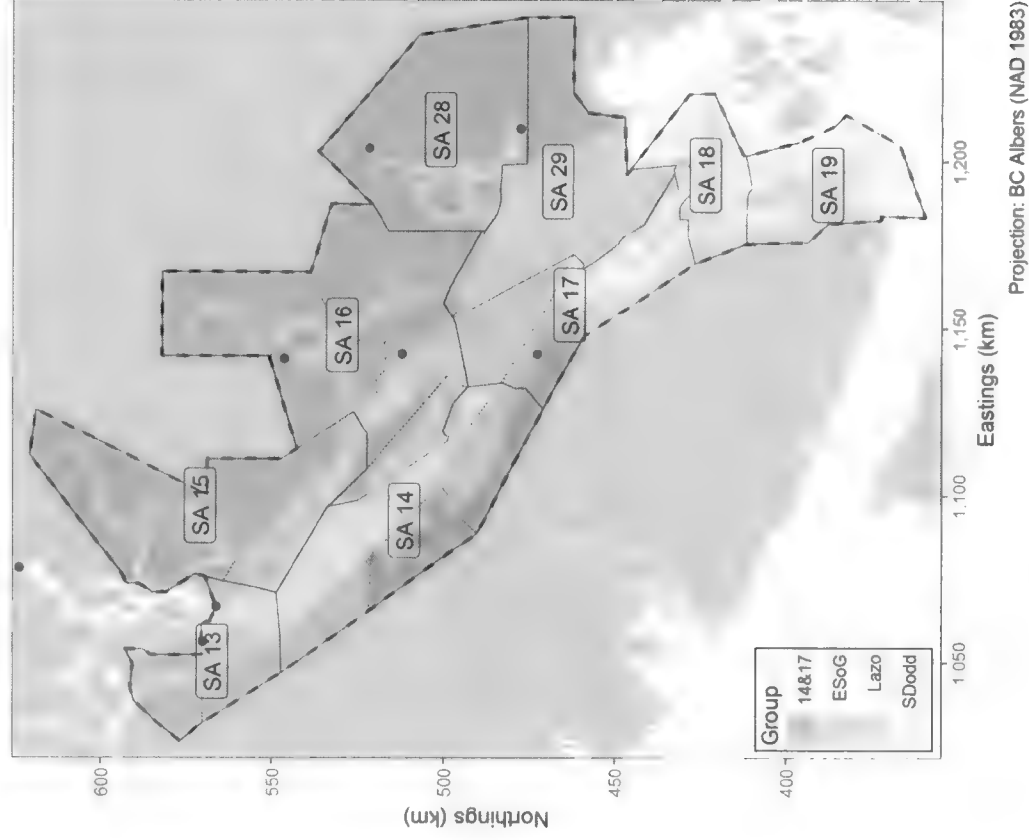
PFMA 14 - Spawn Flight Observations

- Spawn Flight Program
 - 22 flights
 - Covered areas 14, 15 & 17
 - Feb 21 – Apr 3
- Spawn Length
 - 40.7 NM observed
 - All in Area 14
- Spawn Dates
 - Mar 8 – Mar 21
 - Apr 1 – Apr 3



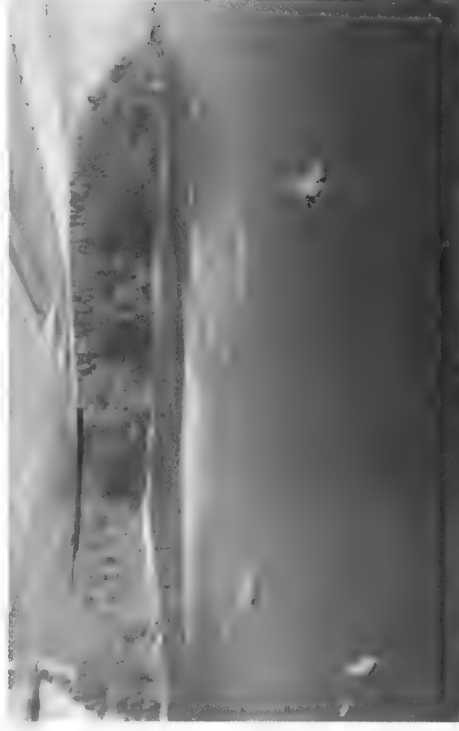
Tree Island Spawn – Mar 13, 2019
Photo Credit – Stew Pearce

Strait of Georgia Spawn Reports

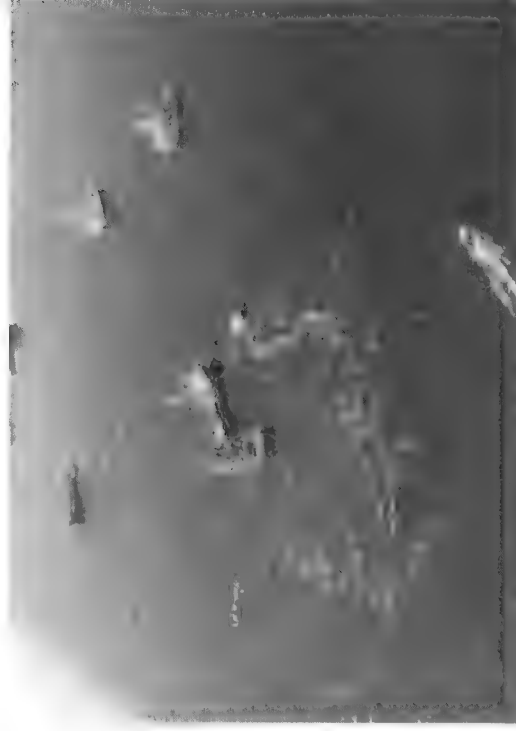


Strait of Georgia - Fisheries

- Food & Bait
- Special Use
- Roe Herring Seine
- Roe Herring Gillnet
- FSC:
 - Spawn on Bough
 - Spawn on Kelp
 - Whole Herring



Gillnet Fishery – Mar 19, 2019
Photo Credit – Stew Pearce



Seine Fishery – Mar 13, 2019
Photo Credit – Stew Pearce

SOG Food & Bait Fishery 2019

- Quota: 7,710 short tons
- Number of licences: 252
- Quota per licence: 23.8095 short tons
- Fishery Opening: Nov 7, 2018 – Feb 12, 2019
- Roe to Food & Bait Conversions:
 - 43 conversions @ 39.7658 short tons = 1,710 short tons
- Management Measures South of Dodd Narrows:
 - Area 17 S (includes subareas 17-1 to 17-9, portions of 17-16, 17-17) and Area 18 did not open in 2018-19. Replaced 1,000 short ton catch cap.
 - Subarea 29-5 – 4,000 short ton catch cap remained in place.
- 6 occurrences:
 - 2 releases (25 tons), 2 sea lion interactions (4 fatalities), 2 other

Area	Subareas	Landings (Short Tons)
14	14-1, 14-3, 14-4	1,512
17	17-12, 17-13, 17-18, 17-19	3,680
29	29-5	2,311
Total		7,503

SOG Special Use Fishery 2019

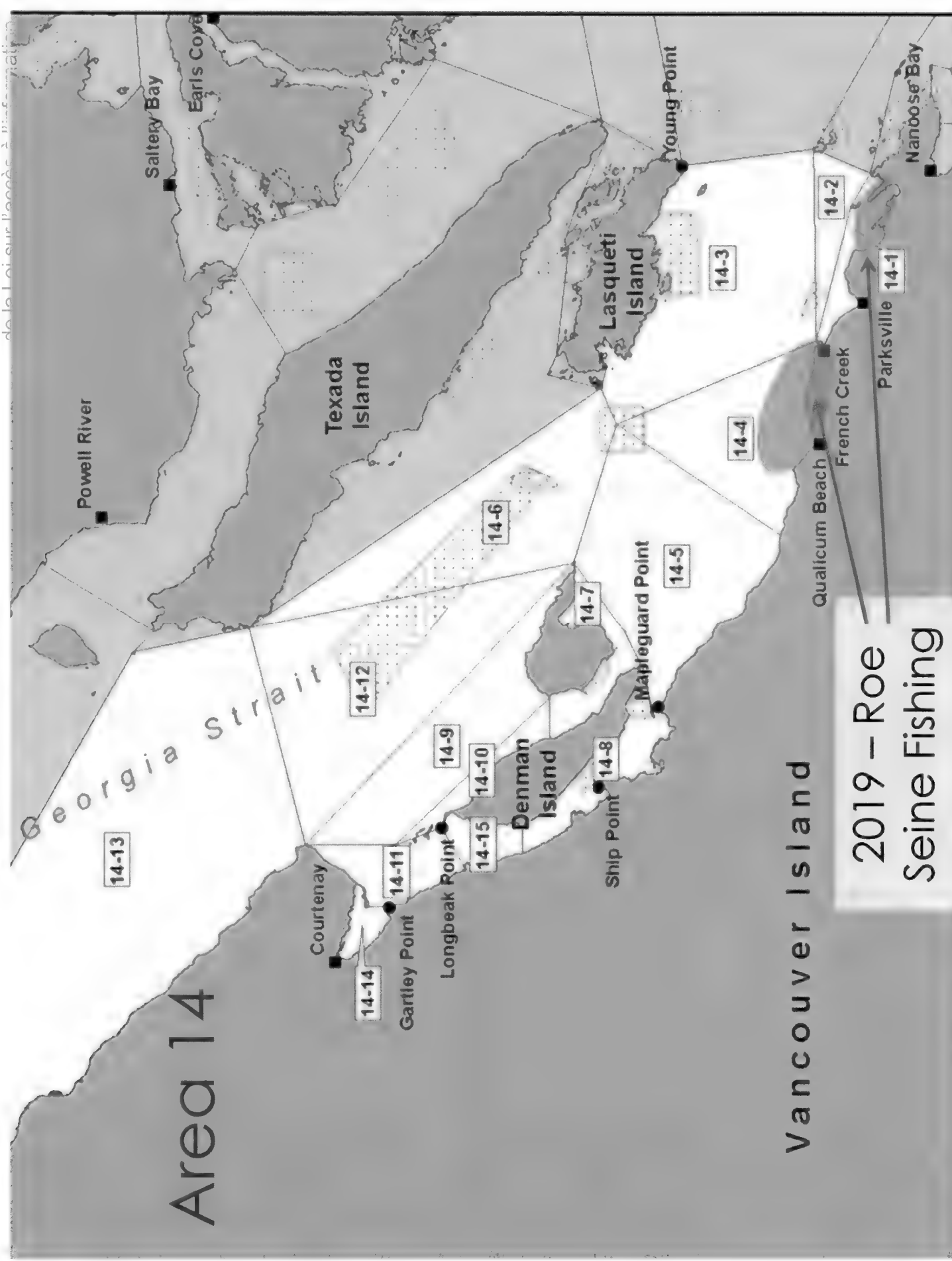
- Personal use, sport/commercial bait, human food, zoo and aquarium
- Fishery open in SOG only
 - November 7 - February 15 (all quota)
 - May 1 - October 1 (≤3 ton quota only)
 - October 1 - November 7 (reopens to quota ≥ 3 tons)
- Number of licences: Unlimited (until quota reached)
- Most catch areas cannot be released due to third party rule
- A-Tlegay pilot continued (started in 2016/17)

License Category	Quota	Quota Issued	Catch
ZX	25	0*	0*
ZY1	617	445*	280*
ZY2	0	0	0
ZY3	150	150	Private
ZY4	110	110	Private
Total	902	705*	540*

SOG Roe Seine Fishery - 2019

- Quota: 8,311 short tons
- Fishery Opening: March 9 to March 15, 2019
- Number of licences: 209
- Quota per licence: 39.7658 short tons
- Licenced Pools: 7
- Management Platform: Canadian Shore (Feb 27-Mar14)

Fishing Dates	Location	Landings (Short Tons)
March 9 & 10	NW Bay to Brant Pt Subarea 14-1	4,325.8
March 13	Qualicum Beach to French Creek Subareas 14-3, 14-4	2,852.1
Total		7,177.9

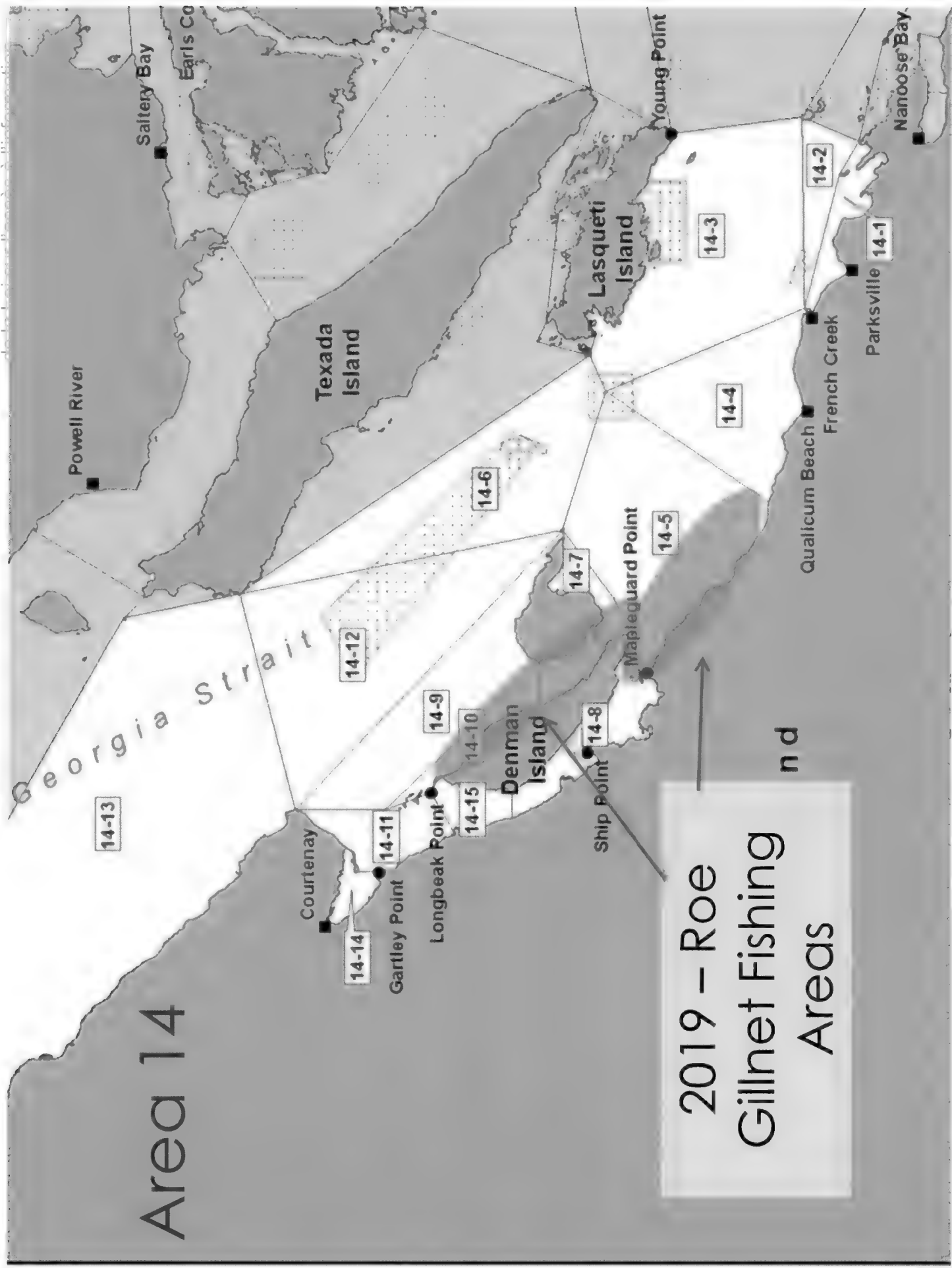


2019 - Roe
Seine Fishing

SOG Roe Gillnet Fishery - 2019

- Quota: 11,472 short tons
- Fishery Opening: March 15 to April 4, 2019
- Number of licences: 1,190
- Quota per licence: 9.640 short tons
- Licenced Pools: 14

Fishing Dates	Location	Landings (Short Tons)
March 15 – March 21 Apr 1	East Coast of Denman South Coast of Denman Vancouver Island Shoreline – Mapleguard Pt to Qualicum Beach Subareas 14-5, 14-7, 14-8, 14-10	8,373.7



SOG FSC & First Nations Communications 2019

- FSC Allocation: 35 short tons
- Fishery Opening: Year-round
- Herring Communications Coordinator: Information sharing
 - spawn observations
 - commercial fleet fishery updates
 - Test activities
 - Staging of FSC and access

SOG Quota & Catch (Short Tons) 2019

Fisheries	Quota	Catch
Food and Bait	7,710	7,503
FSC*	35	3
Special Use*	902	540
Roe Seine	8,311	7,178
Roe Gillnet	11,472	8,374
TOTAL	28,430	23,598

*Based on reports to-date, final catch numbers not available.

Discussions

- Areas with lack of recently observed spawn continues.
- Shellfish sanitary contamination in Baynes Sound in 2017 and 2018 – fleet adjustments and in season measures
- Drone use in close proximity to fishing vessels safety concern
- Sea Lions
 - Impacts to stocks, harvesters, fishery and safety
 - Impacts to sea lions (e.g. use of deterrents)



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Central Coast Area

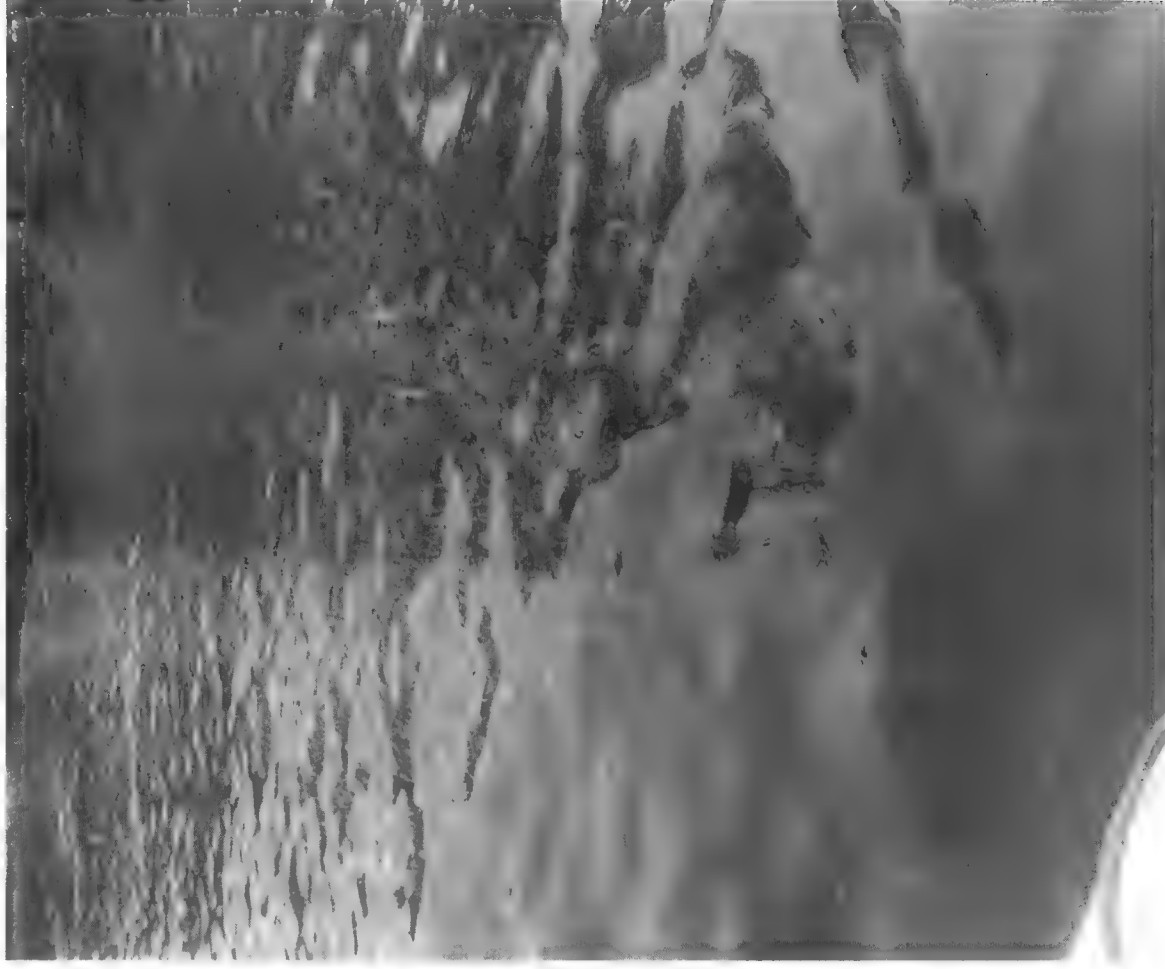
Areas 6,7,8

and also Area 10

Resource Managers:

Kristen Wong

Bradley Koroluk



Canada

Harvest Level Decision Context - CC

- Spawn-on-Kelp (SOK) opportunities only, to a maximum of 1,265t.
- Decline in spawning biomass for the past two years, with a slight increase in forecasted spawning biomass for 2019. The stock growth has tended to be near zero or negative over recent years.
- The allocation to SOK fisheries combined with the FSC allocation results in an estimated harvest rate of 9.4% and a probability of breaching the LRP of 45%.
- SOK allocation is provided due to the inability of operators to move to other stock areas, and the relationship between abundance and harvest for this fishery.
- Heiltsuk First Nation have an established Aboriginal right to a commercial SOK fishery, and the three other commercial SOK operations that typically operate in Area 8 were not licensed for the 2019 season, to support the constitutionally protected Aboriginal rights, and also to meet the objectives of conservation and ensuring orderly and well-managed fisheries.

2019 Stock Assessment Resources

- Management Platform: CCGS Vector (Mar 17-Apr 4)
- Dive charters: Ocean Cloud (Mar 27-Apr 14)
- Pachena (Apr 2-19)
- Test vessels: Windward Isle (Mar 19-Apr 9)
- Spawn Overflights: (Mar 21, 24, 28, 31, Apr 4, 2019)
- GN Sounding Platforms:
 - Lady Raven: Mar 19 – 27
 - Royal Jazz: Mar 22 – Apr 3
 - Three Girls II: Mar 19 – Apr 5

Central Coast Area Spawn Flight Observations

- Good flying conditions, clear and sunny.
- Few signs of wildlife, birds for most of the season other than active spawn.
- 5 Flights: March 21, 24, 28, 31 and April 4
- Major spawn locations heavily spawned by end of March, only a few isolated spawns noted/reported in April.

Central Coast Area - Dive Survey Estimates

- Central Coast Total - 96 nautical miles (178 km)
- Area 6 - 21 nm (39 km)
- Area 7 - 67.5 nm (125 km) consistent heavy spawn
- Area 8 - 7.5 nm (14 km)

PFMA 6 - Spawn Flight Observations

21 NM spawn activity observed
Test samples (1)

Spawn started March 18 in Kitasu Bay, then
started again 5 or 6 days later. Continued
for several days throughout the entire bay
and into Meyers Pass

DIVE SURVEY RESULTS

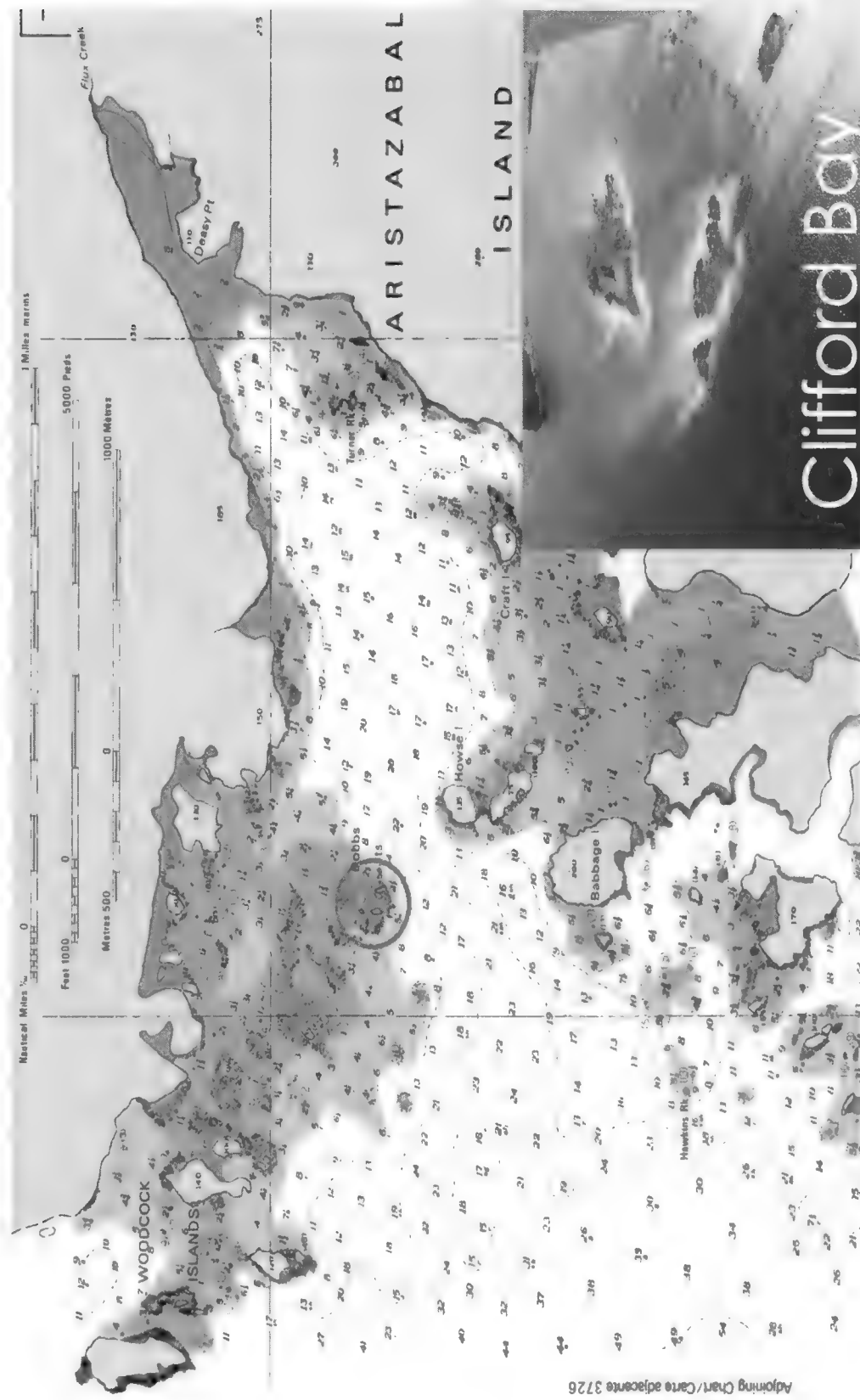
Area 6 spawn total 21 nm (32 km)

Kitasu Bay - 12.5 nm (23 kms)

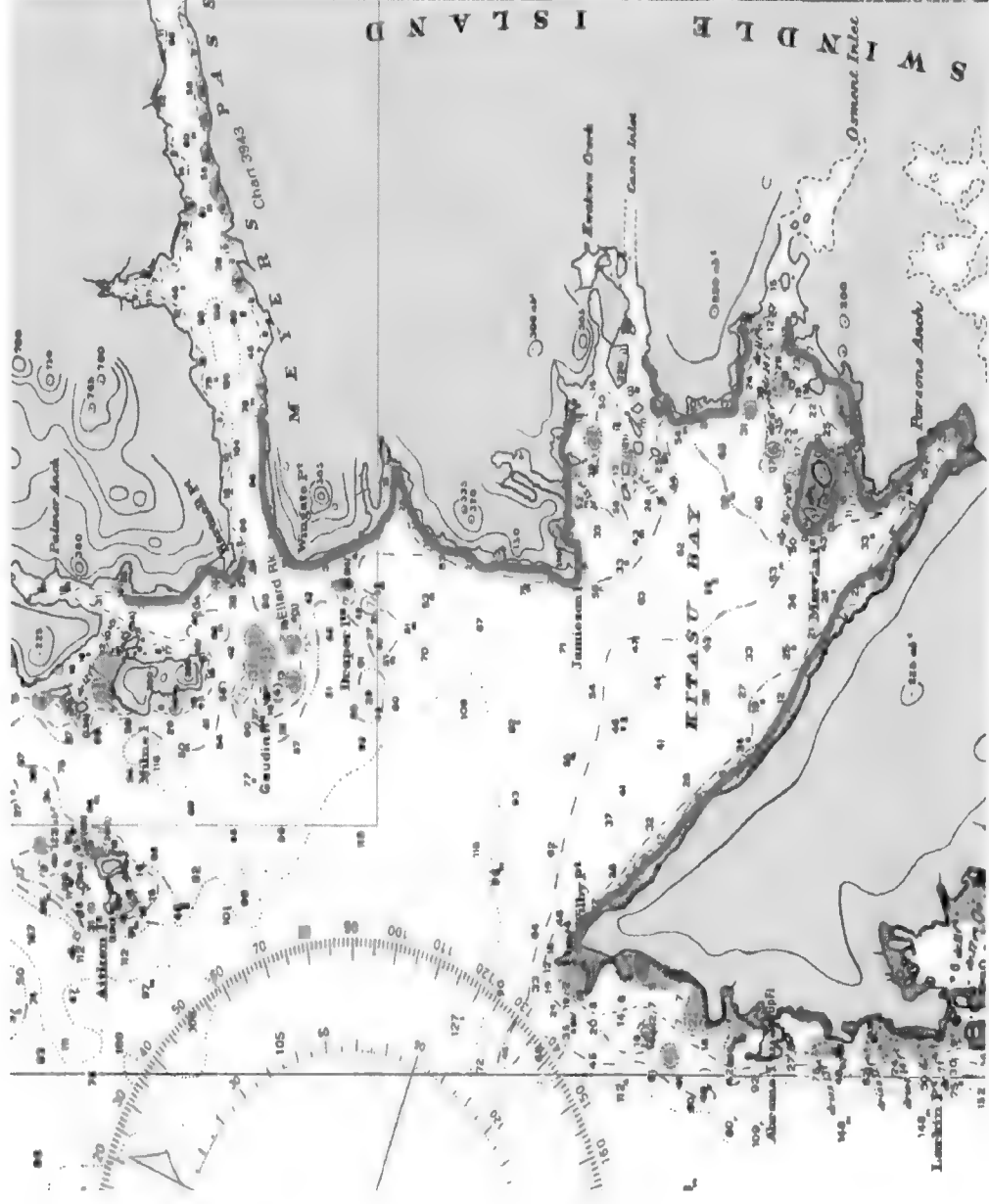
heavy spawn 2 - 3 layers average up to
15+ layers

Meyers Pass, Meyers Narrows, Thistle Pass -
8.5 nautical miles (16km)

PFMA 6 - Spawn Observations



PFMA 6 - Spawn Observations



Central Coast – Area 6 & 7-3 SOK Fishery



of Licences and Areas fished:

- Three closed pond licenses pooled
- Operations in Kitasu Bay & East Higgins

Landed:

- Met quota

Fishery Start:

- Mar 18, 2019

Validation Start:

- March 29, 2019

- The 3 licences (J15, FJ17, J28) were pooled again this season.
- There were 6 ponds set-up in Kitasu Bay (2 in Parsons Anchorage and 4 around Marvin Islands) between March 18 & March 31. Three deliveries at Kitasoo Seafoods in Klemtu.
- One pond was set-up in East Higgins between March 31 and April 8.
- One delivery was validated in Prince Rupert.

PFMA 7 - Spawn Flight Observations

70 NM spawn activity observed

Test samples (6)

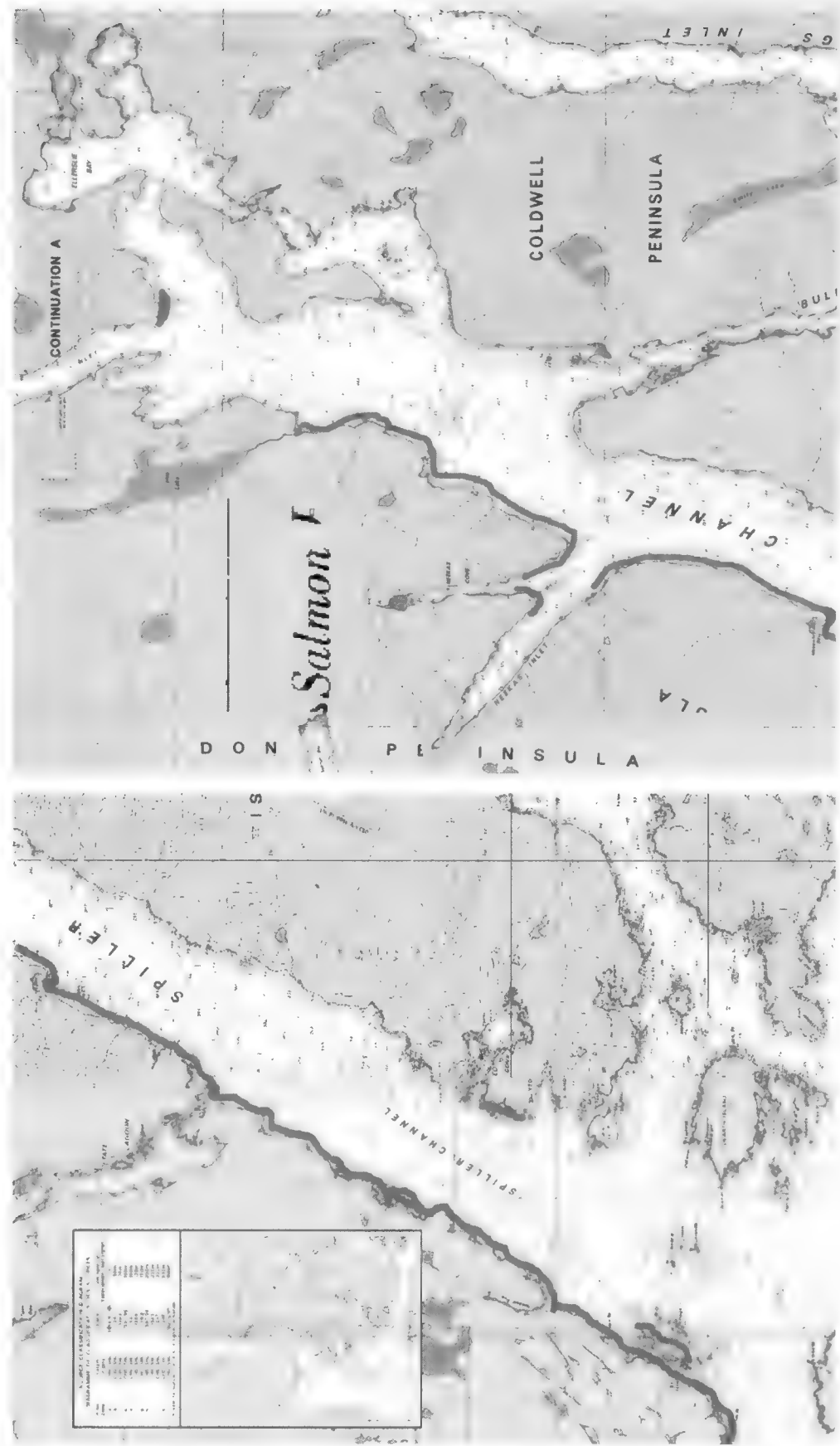
Area 7 spawn total 67.5 nautical miles (125 km)

consistently heavy spawn

- Spiller Inlet 4.5 nm 2-3 layers heavy
- Ellersley Bay 2.5 nm 2-3 layers heavy
- Spiller Channel - Yealands shore 7nm 2 layers average
- Spiller Channel - West shore including Boote Is, NeekIs inlet and Neekis Cove 27 nm 2-3 layers average coverage

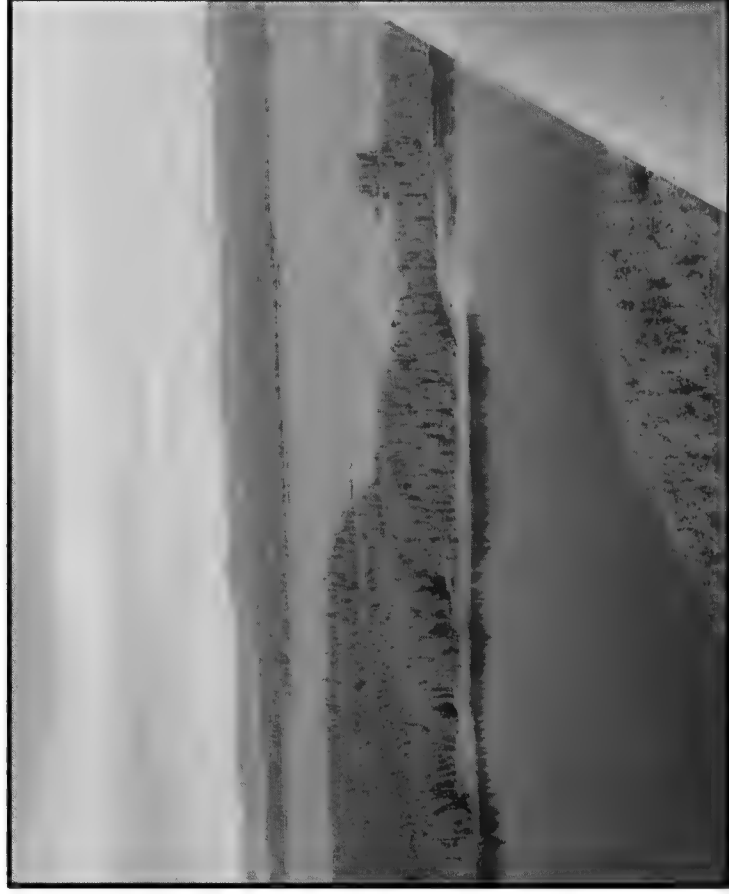
- Spiller Lagoon - 4nm 2 layers average
- Seaforth Channel, Watch Is - 5 nm
- Norman Morrison - 4.5 nm lighter spawn
- Mathieson Channel, Kynoc Inlet, Culpepper Lagoon, East Higgins and Idol Point - 13 nm total

PFMA 7 - Spawn Observations





Central Coast – Heiltsuk SOK Fishery in Area 7



Heiltsuk SOK Quota Target:

- 304,000 lbs *Macrocystis*,
- 12,000 lbs *Egregia*

Landed:

- *Macrocystis* quota met
- no *Egregia* harvested this season

Fishery Start: March 20, 2019

Validation Start: March 26, 2019

Harvesting activities began March 25, validations from March 26th to April 2nd.
The Heiltsuk SOK Committee officially closed the 2019 Heiltsuk SOK fishery at
7:09 pm on April 3rd.

PFMA 8 - Spawn Flight Observations

7.5 NM spawn activity observed
Test samples (3)

Photo Near Kwakwaka Point

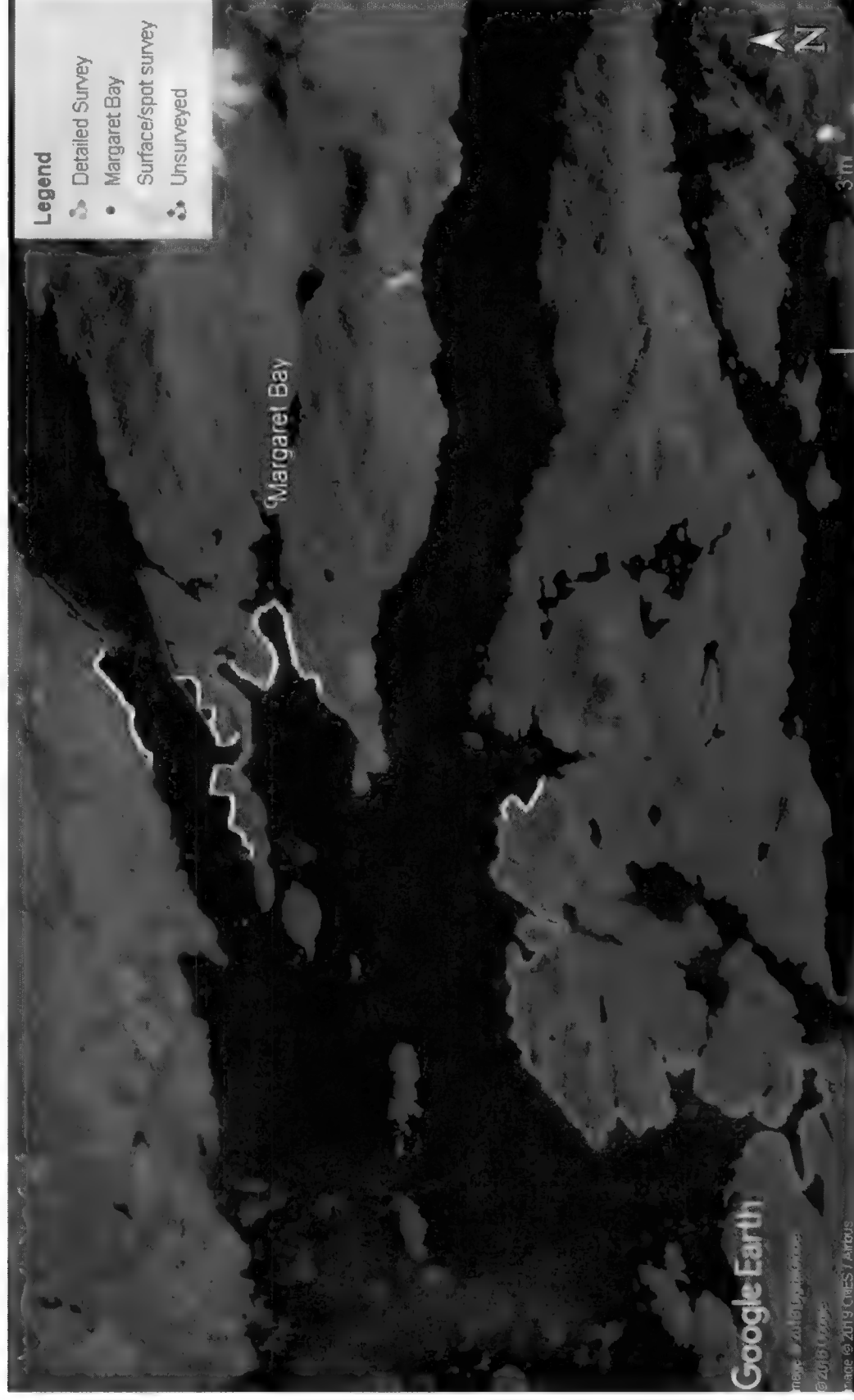
Kwakwaka Point 2.5 nm light
spawn

Pruth Bay 2.5 nm 2 layers average
Mustang Bay - 2.5 nm heavy spawn
in the head of bay, light on
perimeter

One mile of spawn in the bay
above Whitby Pt.



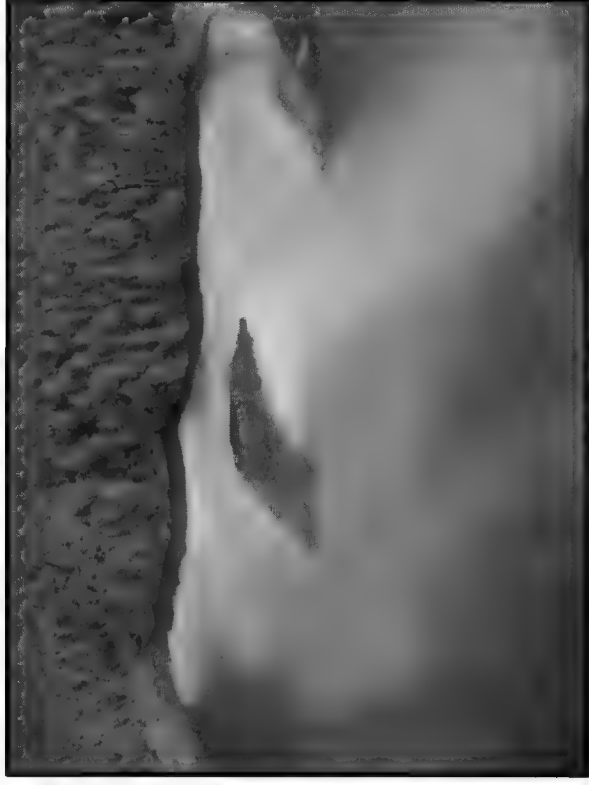
PFMA 10 – Summary of Spawn



Central Coast Area Notes

- Spawn early in general, Kitasu Bay said to be earliest in two decades. One initial spawn with no backing fish, then additional extended spawn 5 or 6 days later.
- Shoreline assessment opportunities could include use of a ROV from CCG Vector.
- Satellite images could be used in 2020 for spawn?
- Collaborative work with HIRMD herring program was very successful. Thanks to all the staff.

Central Coast – Area 10 SOK Fishery



of Licences and Areas fished:

- Two open pond J licences and one closed (option to open pond) J licence in the area
- One open pond licence operated in the area this season

Landed: limited

Harvest date: March 24 & 25, 2019

Validation date: March 26, 2019

Commercial Spawn-on-kelp (SOK) opportunities were provided in Area 10, under a precautionary management approach.

Licence J4 set their open pond lines in Mud Bay this season. J4 2019 quota was 18,000 lbs. As a precautionary approach to this season, the operator set a limited number (~700) of kelp fronds on their lines and only harvested those fronds with good quality coverage (~500). They harvested their product on March 24th & 25th.

The product was landed in Port Hardy on March 26th

PRD Area 2019

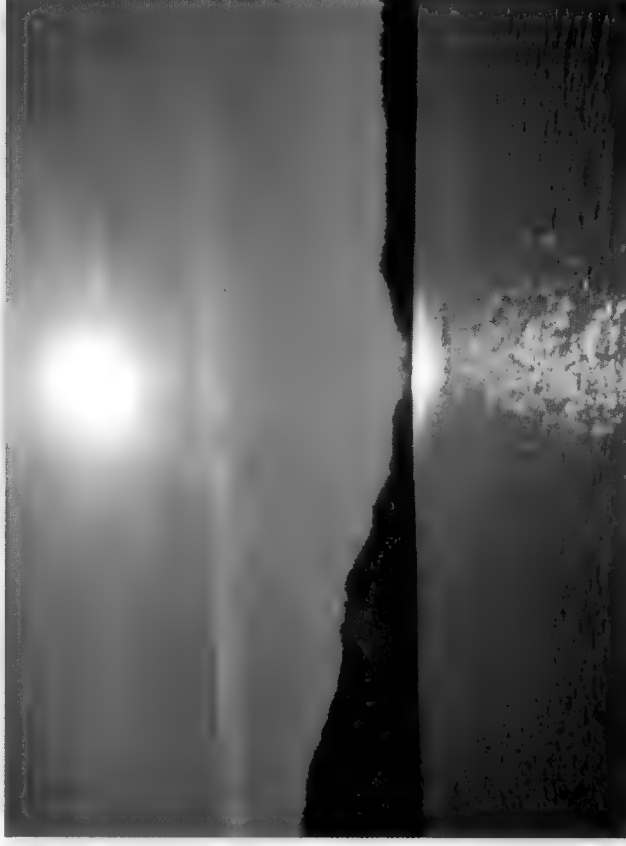
Big Bay Area 4 and
Kitatla Area 5

Resource Managers:

Jen Gordon

Corey Martens

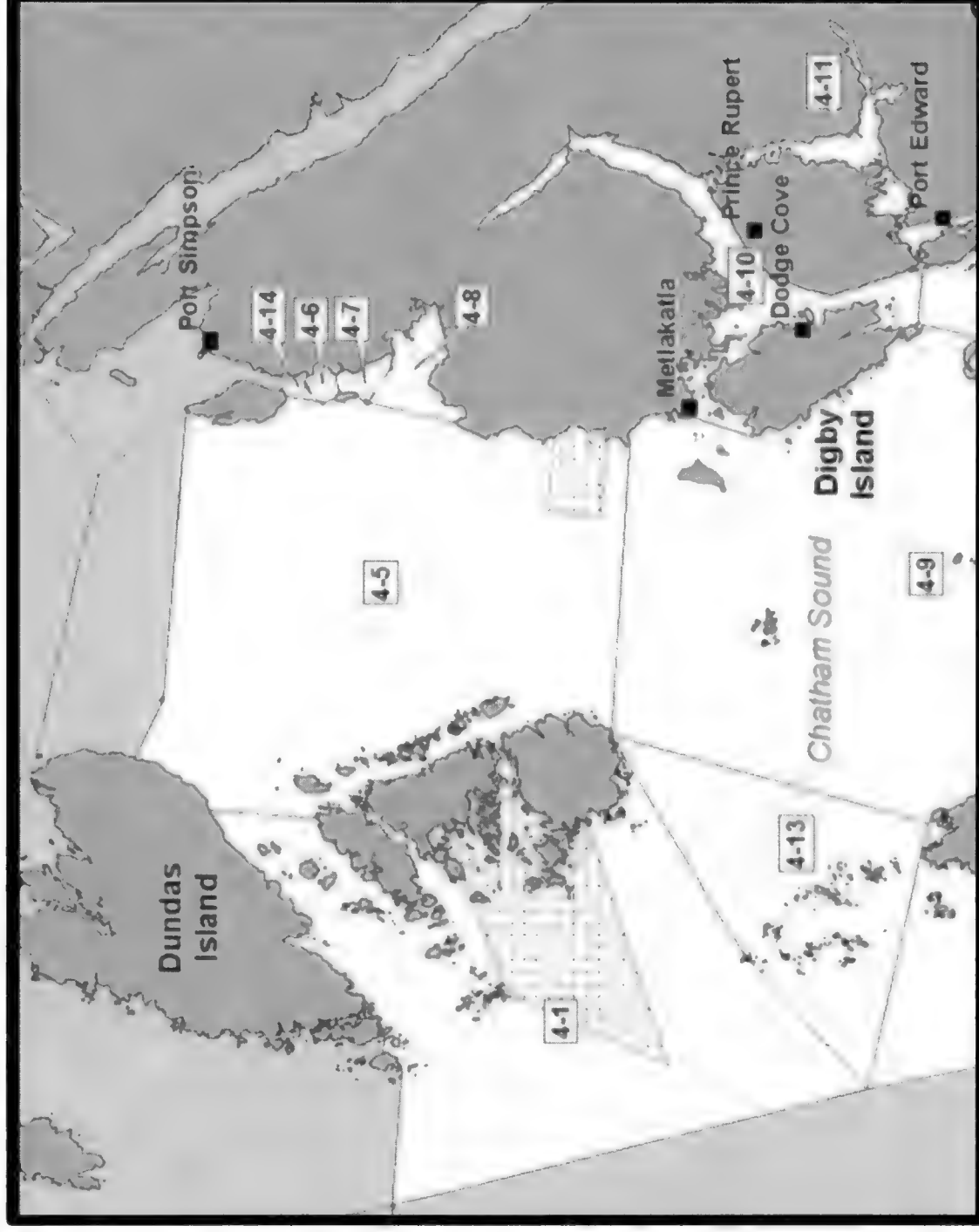
Steven Groves



Harvest Level Decision Context - PRD

- Spawn-on-Kelp (SOK) opportunities only, to a maximum of 1,000 tons, was permitted
- Since the mid-1980s, the estimated spawning biomass declined before stabilizing at a relatively low level with annual commercial fishery catches.
- The allocation to SOK commercial fisheries combined with the FSC allocation results in an estimated maximum harvest rate of 7.4%, and a probability of breaching the LRP of 50%.
- A SOK allocation was provided due to the inability of operators to move to other stock areas, and the relationship between abundance and harvest for this fishery.

PFMA 4



Stock Assessment Resources

Herring Coordinator: Corey Martens

- Charter vessel: Nita Maria
 - 13 day charter: March 15 - 28th.
- Splash 3+ Drone (waterproof) – pilot project
- Lax Kwalaams First Nation surveys
 - captured later spawn after the departure of the charter vessel.

Big Bay Area - Fisheries

FSC and SOK fisheries only
Sub-areas set aside for FSC fishing

SOK - one operator with 3 licenses
activated.

Fishery closed on May 1
Quota not achieved.

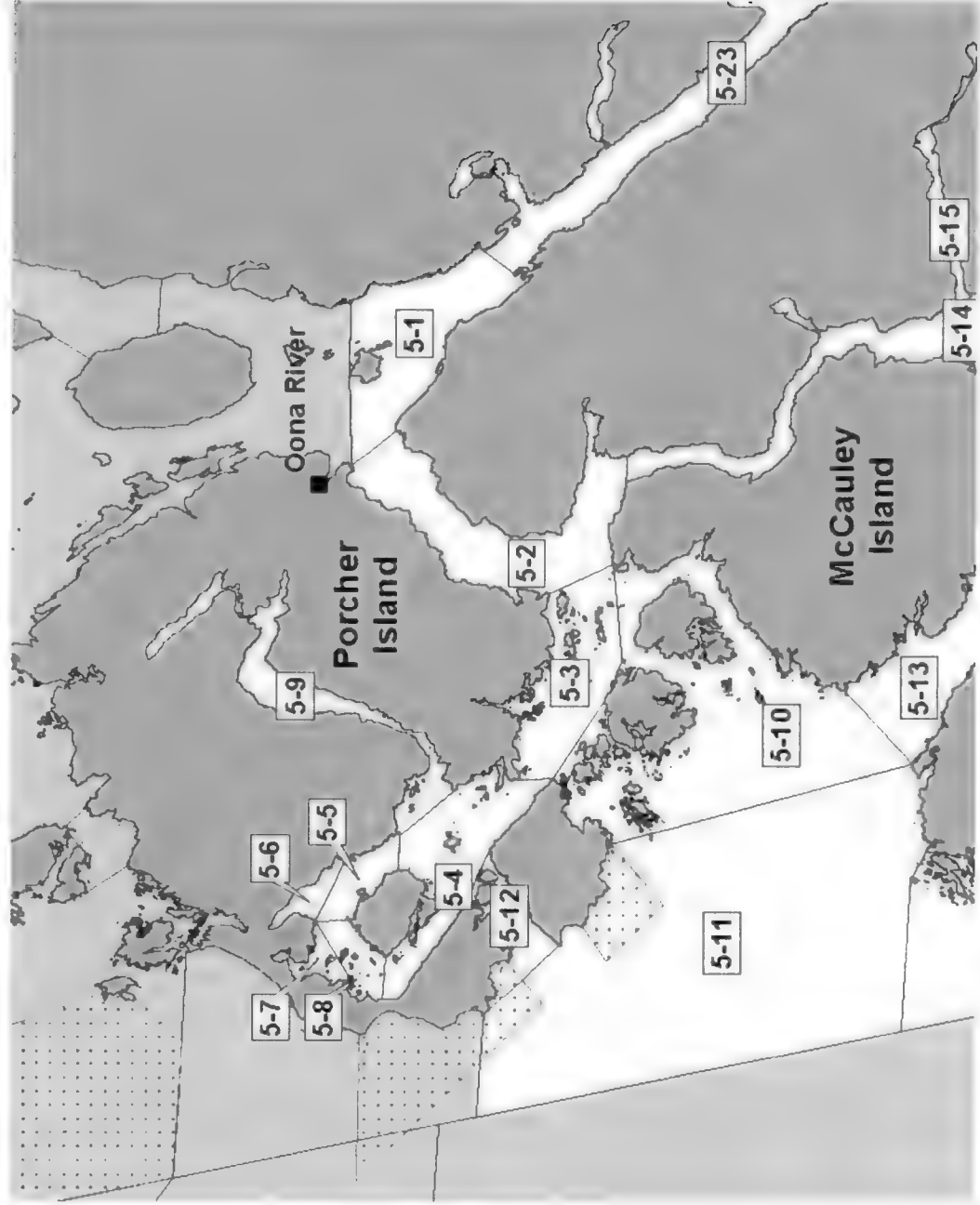
Area Notes

- Spawn timing (March 19th - Burnt Cliff Island) and location was similar to 2018. Spawn length increased for 2019 approx. 37 nm.
- All herring sampled were observed to be below cut-off (small).
- Lax Kwalaams Fisheries was very helpful in assisting with spawn location after the science charter was complete.
- Spawn in Big Bay assessment area was an improvement compared to 2018.

Discussion – Successes/ Challenges

- Use of the drone was very informative for locating and gauging abundance of herring in the shallows.
- The drone could be used to confirm spawn location , intensity and extent when the test boat or skiff cannot get to the beach.
- First Nations did not support the commercial SOK fishery.

Stock Assessment Area – 5



2019 Stock Assessment Resources

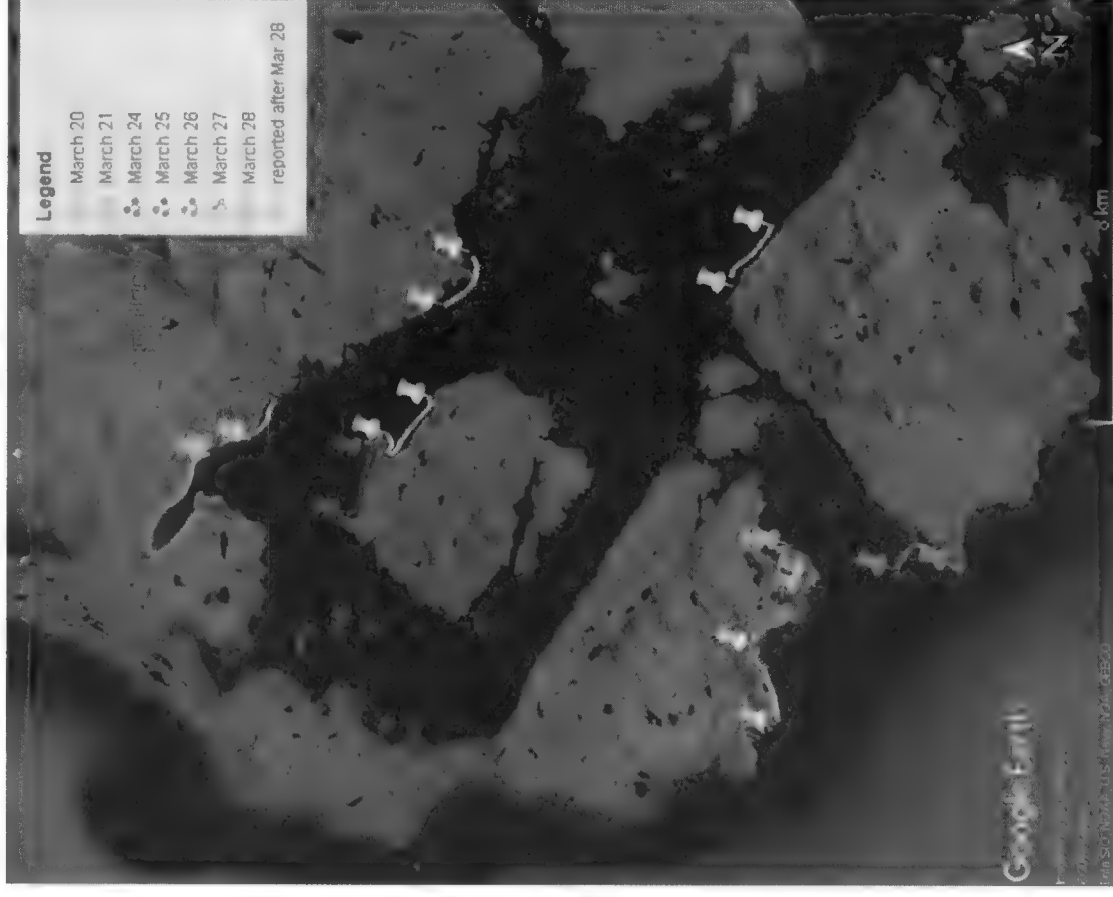
- Test Vessel:
Fransiscan #1
- Dive Vessel:
Royal Pride
- Gitxaala Environmental
Monitoring:
Gitxaala Spirit



Area 5 Spawn Observations

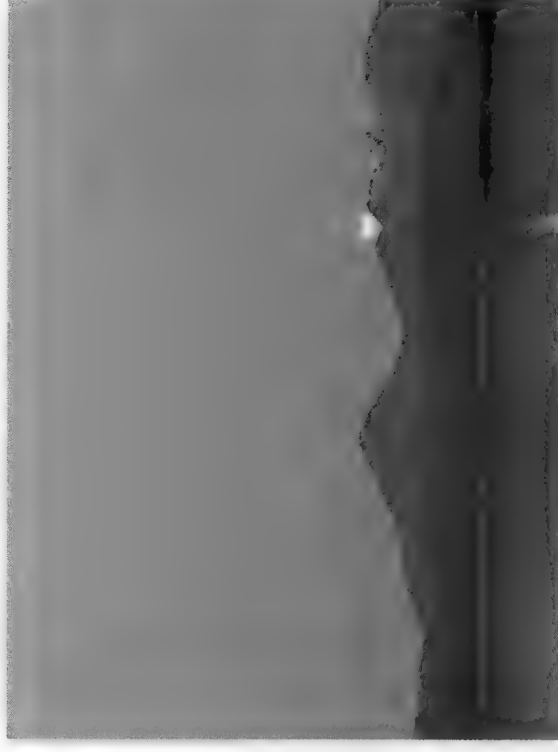
- 1st spawn observed at Dries Inlet on March 20th, then spread down to Kitkatla Creek.
- Large spawn outside of Freeman Pass.
- ~7.5 NM spawn activity observed.
- 7 test samples taken.
- Reports of spawn at Willis Bay and Banks Island prior to test fishery.
- Spawn reported to have continued and spread after test fishery.

PFMA 5 - Spawn Observations



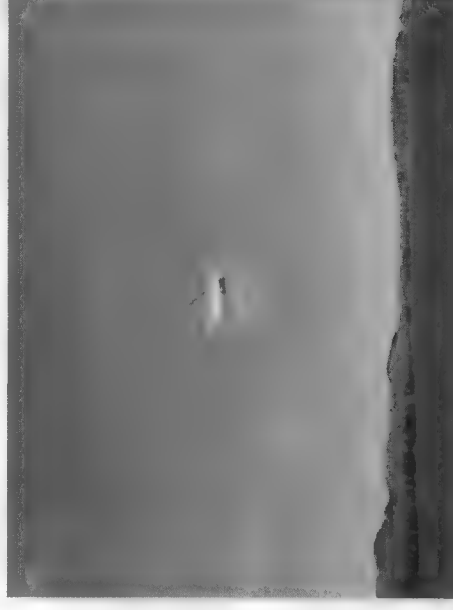
Area 5 - Fisheries

- Roe on Kelp
 - 5-1 to 5-12 open March 19 – May 31
 - 1 licence activated, 3 ponds + open ponding
 - March 31 – April 8
 - Fishing ongoing
- Gitxaala FSC
 - Open ponding
 - Roe on Kelp or Hemlock
- No seine fishery in 2019.



Area Notes

- 2019 was a good year for spawn – approx. 6500
† sounded from March 15 – 28.
- Locals refer to 2 waves of fish
 - Roe @ ~11% on March 15th; 2nd wave on March
28th - ?
- Did not have an opportunity to test the drone,
hopefully in 2020!



Haida Gwaii

Resource Managers:

Pat Fairweather

Peter Katinic

Harvest Level Decision Context - HG

- Stock area was closed.
- Stock biomass and growth have been low for almost 20 years. The stock is forecast to be below the Limit Reference Point (LRP) with a 73% probability with zero catch.
- Development of a Rebuilding Plan is underway with a target date of 2020.

2019 Stock Assessment Resources

- Management Platform – None available
- Roe Test Charter – Queens Reach Dive
(March 9 to April 1)
- Spawn Recon. Charter – Victoria Rose (April
1 to 19)
- HG Spawn Dive Charter – Haida Spirit (April 3
to 20)
- 2W Surface Survey Charter - Atlas (April 1 to
6)

Area Notes

HG

- Sounding relatively similar over past few years.
- Spawn deposition appeared to be higher than past few years based on increased spawned shoreline length and anecdotal reports of egg deposition.
- Unique this year was majority of Selwyn Inlet fish moved through Louise narrows and spawned in Carmichael Passage.
- Survey charters were generally effective and appropriate. May need some review or expansion of Dive charter if larger spawns continue to expand.

2W

- Soundings saw higher abundances in Port Louis
- Spawn was concentrated outside Port Louis in Otard Bay.
- Surface Survey Charter successfully surveyed Port Louis / Otard Bay spawn.

PFMA 2 - Observations

Soundings: (based on soundings)

HG Stock Area = 15,700 tons

→ 11 samples collected

2W Minor Area = 8,100 tons

→ 6 samples collected

Observed Spawn:

HG Stock Area

- Spawns observed March 25 to April 10
- 51.9 nmi (96.2 Km) spawn observed

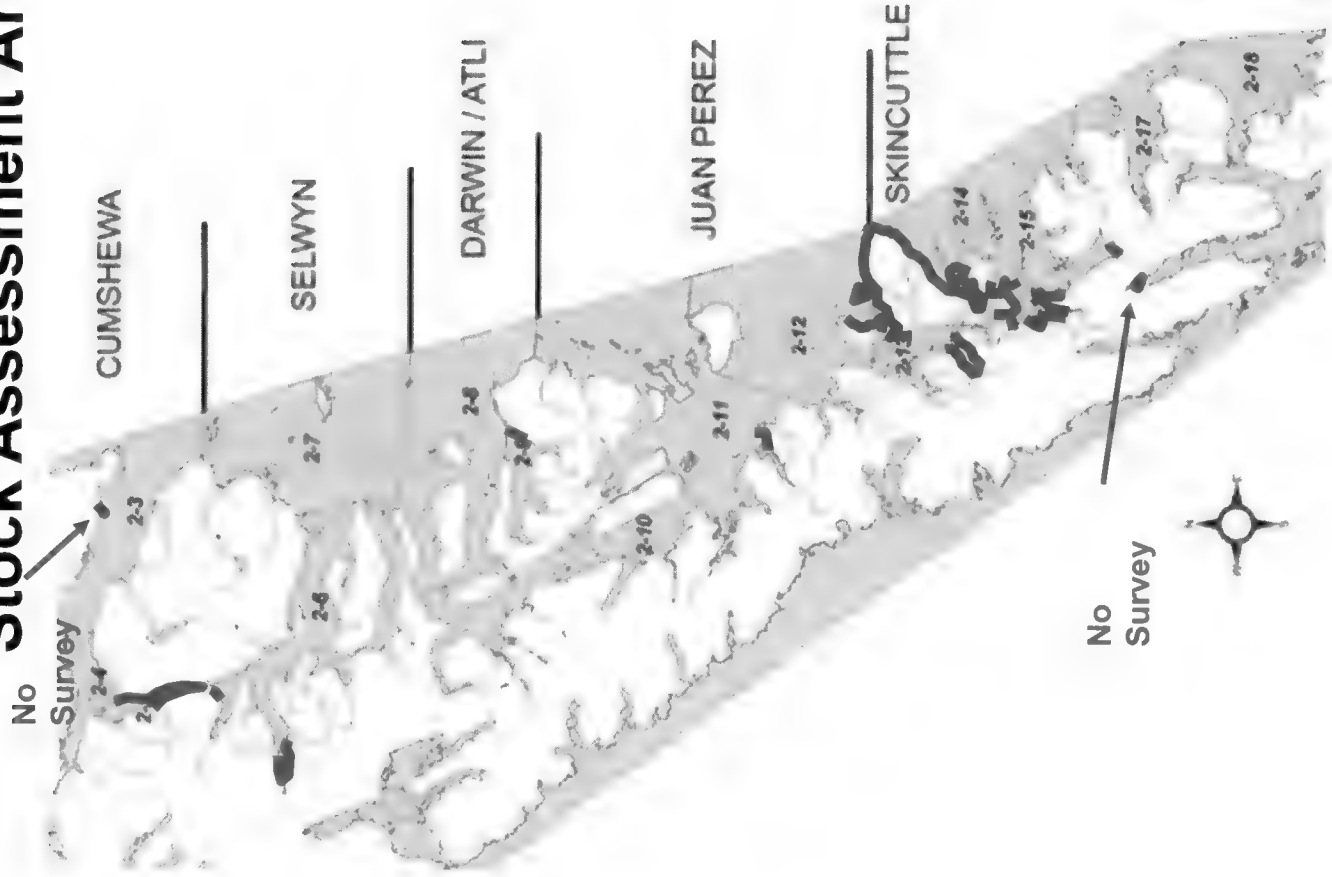
2W Minor Area

- Spawns observed March 19 to April 3
- 6.3 nmi (11.7 Km) spawn observed



Haida Gwaii

Stock Assessment Area



Location	Soundings	Spawn
Cumshewa Selwyn Inlet	1500 t	8.1 nmi (15 Km)
Atli Inlet	20 t	2.5 nmi (4.5 Km)
Juan Perez	5,200 t	2.6 nmi (4.9 Km)
Burnaby	3,500 t	28.4 nmi (52.5 Km)
Skincuttle Inlet	4,000 t	9.7 nmi (18 Km)
Louscoone Inlet	1,500 t	0.6 nmi (1.2 Km)
TOTAL:	15,720 t	52 nmi (96.2 Km)

Area 2W Minor Stock Area

Location	Soundings	Length
Otard Bay /Port Louis	5,700 t	5.2 nmi (9.6 Km)
Port Chanal	Scratches	1.1 nmi (2.1 Km)
Seal Inlet / Rennel Sound	700 t	No Survey
Kano Inlet	350 t	No Survey
West Skidegate	150 t	No Survey
Inskipp	1200 t	No Survey
TOTAL:		8,100 t 6.3 nmi (11.7 Km)



Grant Scott, Dorrie Woodward, Vanessa Minke-Martin, Cath Gray

PRESENTATION BY CHI, ADIMS, AND PACIFIC WILD



DFO INITIATIVES : Q & A



Herring Industry Advisory Board Post-Season Meeting May 2, 2019, Vancouver, BC

Canada

FISHERY/AREA REVIEWS

South Coast Staff

- SOG
- WCVI

North Coast Staff

- CC
- Area 10
- PRD (Big Bay &
Kitkatla)
- HG





Fisheries and Oceans
Canada

Pêches et Océans
Canada

Strait of Georgia

Resource Managers

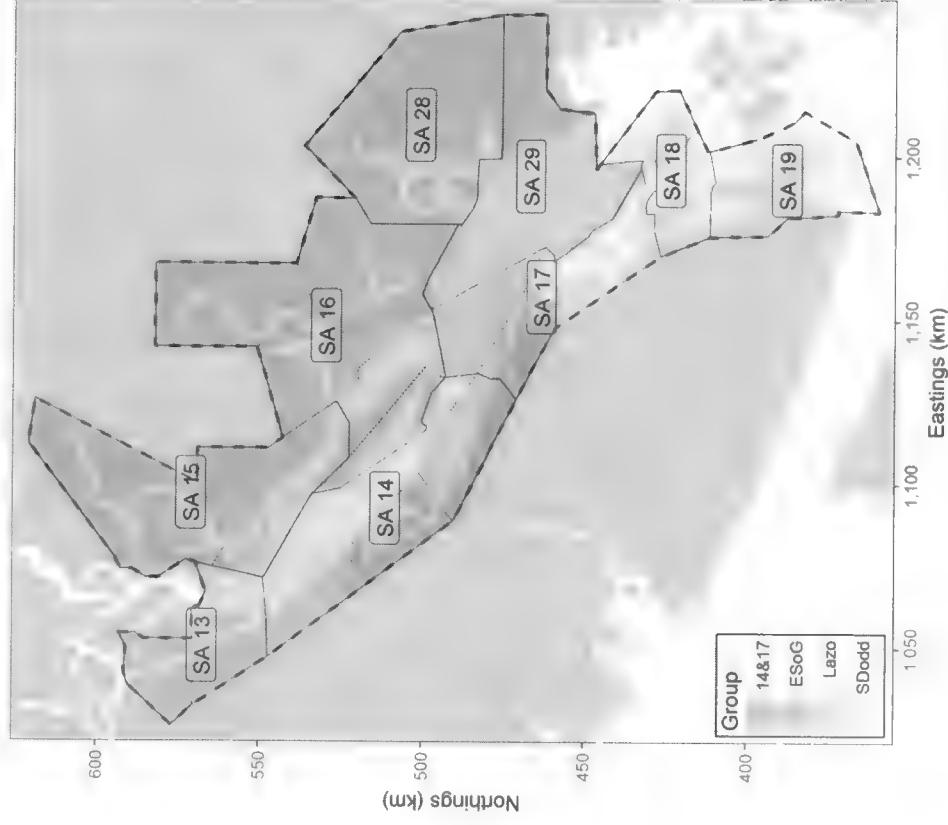
Seines:

Bryan Rusch

Amber Neuman

Gillnets:

Terry Palfrey

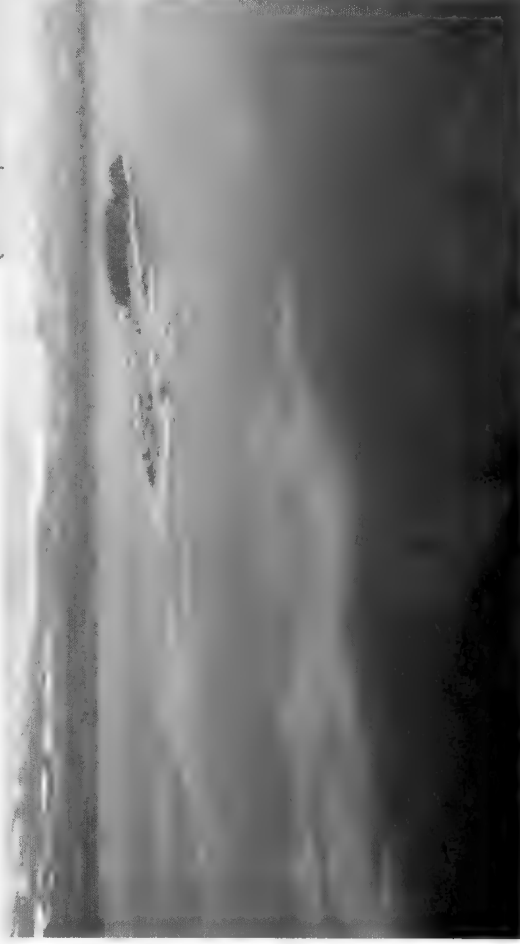
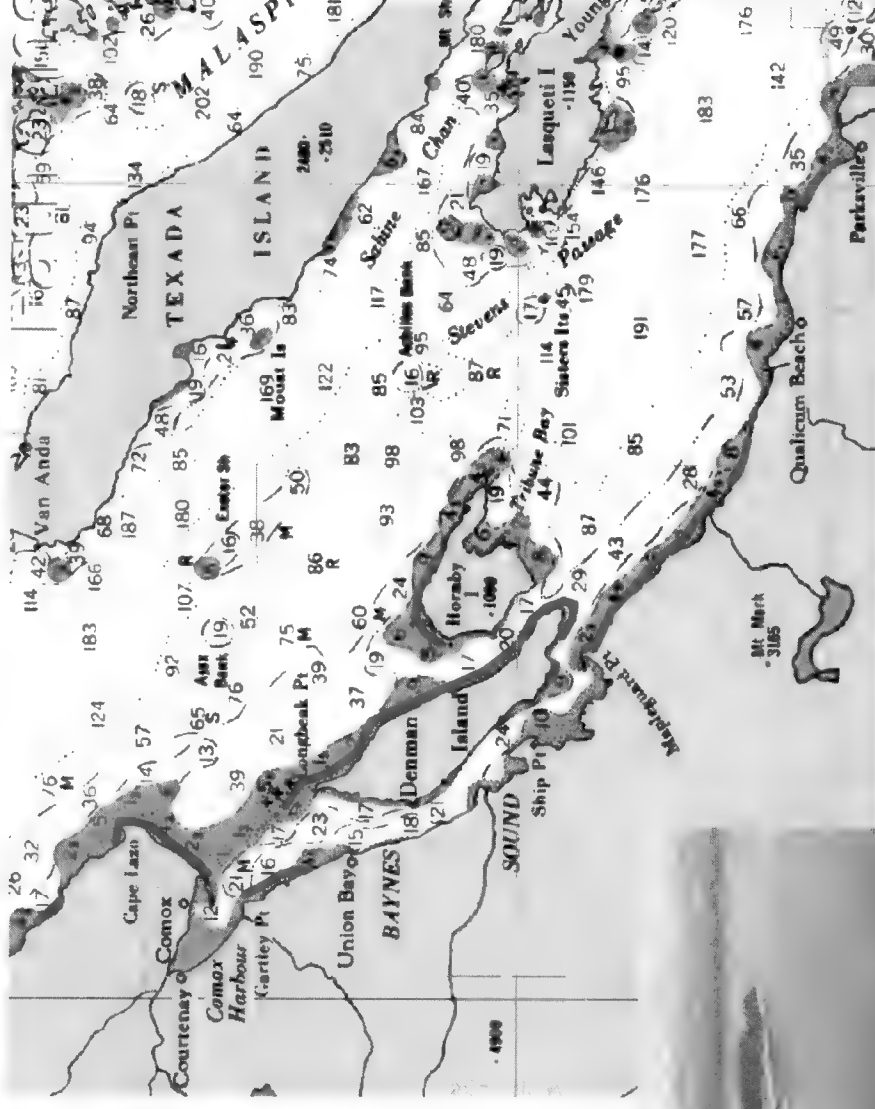


Projection: BC Albers (NAD 1983)

Canada

PFMA 14 - Spawn Flight Observations

- Spawn Flight Program
 - 22 flights
 - Covered areas 14, 15 & 17
 - Feb 21 – Apr 3
- Spawn Length
 - 40.7 NM observed
 - All in Area 14
- Spawn Dates
 - Mar 8 – Mar 21
 - Apr 1 – Apr 3



Tree Island Spawn – Mar 13, 2019
Photo Credit – Stew Pearce

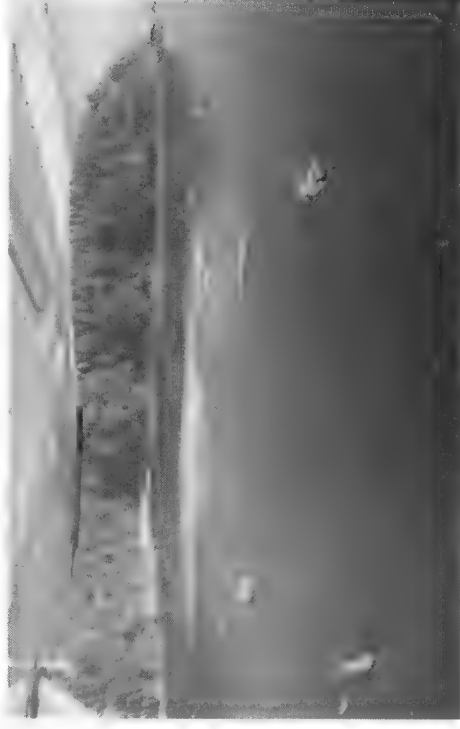
2019 SOG Stock Assessment Resources

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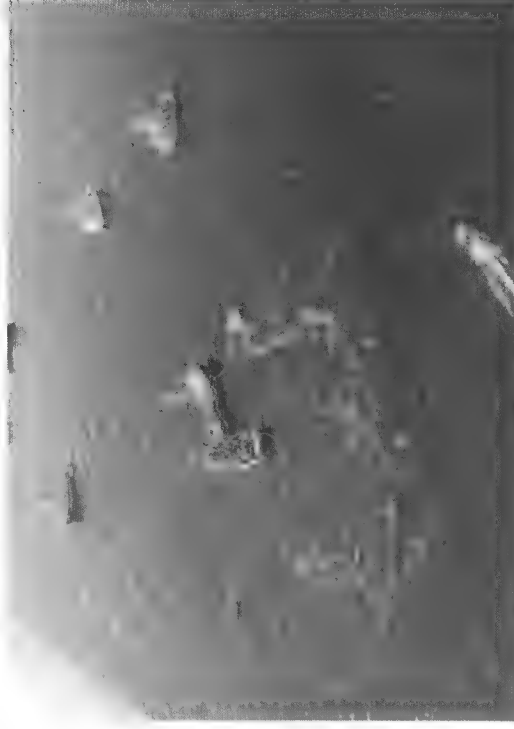
MANAGEMENT PLATFORM	VESSEL MASTER	Dates (# days)
Canadian Shore		Feb 27 – Mar 14 (16 days)
DFO CHARTER TEST VESSEL		
Denman Isle		Feb 20 – Mar 18 (27 days)
INDUSTRY FUNDED TEST VESSELS		
Viking Cavalier		Feb 27 – Mar 12 (11 days)
Nita Maria		Mar 6 – Mar 9 (4 days)
Western Investor		Mar 6 – Mar 9 (3 days)
Western King		Mar 8 – Mar 20 (9 days)
DFO CHARTER DIVE VESSELS		
Viking Spirit		Mar 21 – Apr 13 (21 days)
Ocean Cloud		Mar 20 – Mar 25 (6 days)
SPAWN FLIGHTS	Flight Coordinator	Dates (# Flights)
Seair	Stew Pearce	Feb 21- Apr 3 (22 flights)

Strait of Georgia - Fisheries

- Food & Bait
- Special Use
- Roe Herring Seine
- Roe Herring Gillnet
- FSC:
 - Spawn on Bough
 - Spawn on Kelp
 - Whole Herring



Gillnet Fishery – Mar 19, 2019
Photo Credit – Stew Pearce



Seine Fishery – Mar 13, 2019
Photo Credit – Stew Pearce

SOG Food & Bait Fishery 2019

- Quota: 7,710 short tons
- Number of licences: 252
- Quota per licence: 23.8095 short tons
- Fishery Opening: Nov 7, 2018 – Feb 12, 2019
- Roe to Food & Bait Conversions:
 - 43 conversions @ 39.7658 short tons = 1,710 short tons
- Management Measures South of Dodd Narrows:
 - Area 17 S (includes subareas 17-1 to 17-9, portions of 17-16, 17-17) and Area 18 did not open in 2018-19. Replaced 1,000 short ton catch cap.
 - Subarea 29-5 – 4,000 short ton catch cap remained in place.
- 6 occurrences:
 - 2 releases (25 tons), 2 sea lion interactions (4 fatalities), 2 other

Area	Subareas	Landings (Short Tons)
14	14-1, 14-3, 14-4	1,512
17	17-12, 17-13, 17-18, 17-19	3,680
29	29-5	2,311
Total		7,503

SOG Special Use Fishery 2019

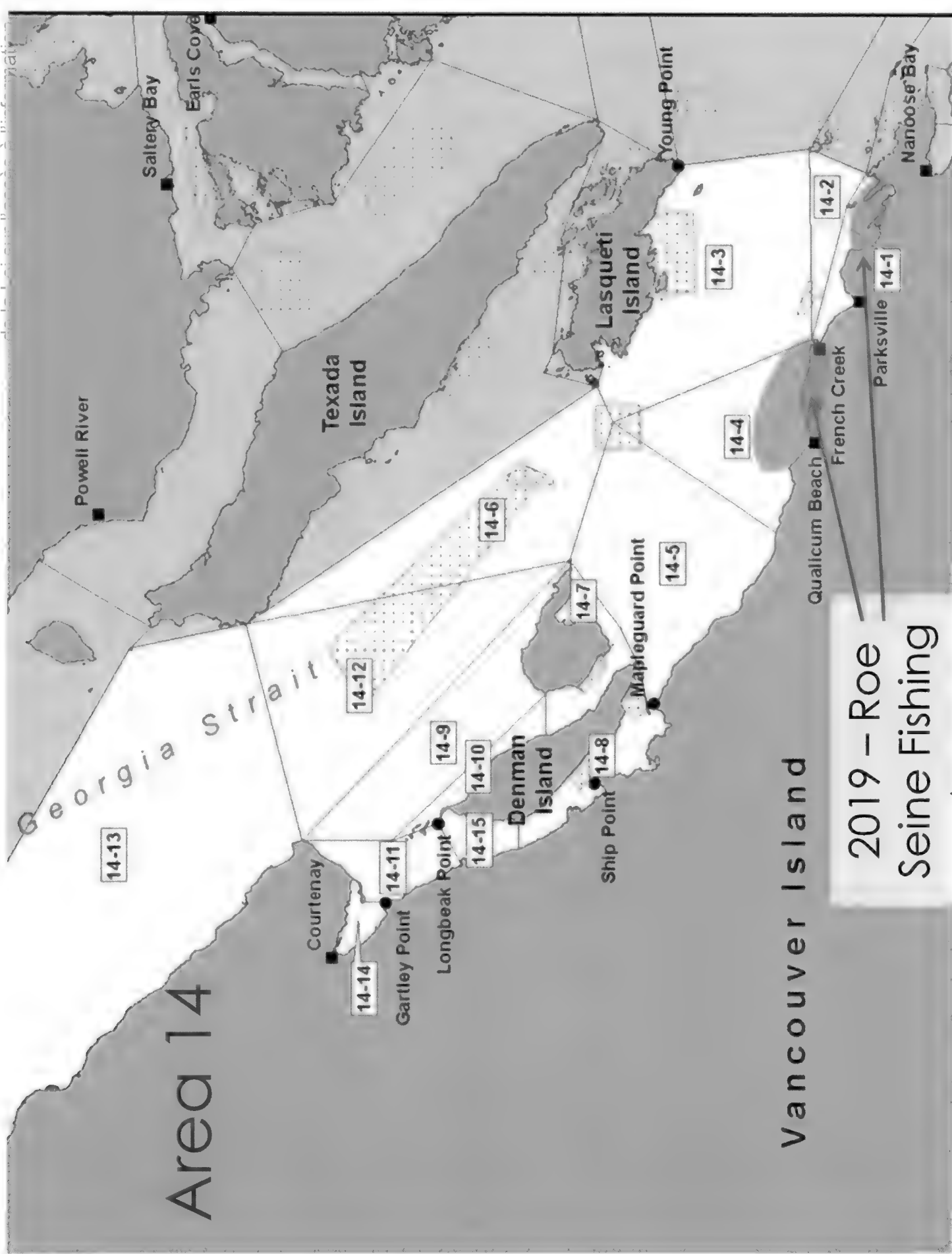
- Personal use, sport/commercial bait, human food, zoo and aquarium
- Fishery open in SOG only
 - November 7 - February 15 (all quota)
 - May 1 - October 1 (≤ 3 ton quota only)
 - October 1 - November 7 (reopens to quota ≥ 3 tons)
- Number of licences: Unlimited (until quota reached)
- Most catch areas cannot be released due to third party rule
- A-Tlegay pilot continued (started in 2016/17)

License Category	Quota	Quota Issued	Catch
ZX	25	0*	0*
ZY1	617	445*	280*
ZY2	0	0	0
ZY3	150	150	Private
ZY4	110	110	Private
Total	902	705*	540*

SOG Roe Seine Fishery - 2019

- Quota: 8,311 short tons
- Fishery Opening: March 9 to March 15, 2019
- Number of licences: 209
- Quota per licence: 39.7658 short tons
- Licenced Pools: 7
- Management Platform: Canadian Shore (Feb 27-Mar14)

Fishing Dates	Location	Landings (Short Tons)
March 9 & 10	NW Bay to Brant Pt Subarea 14-1	4,325.8
March 13	Qualicum Beach to French Creek Subareas 14-3, 14-4	2,852.1
Total		7,177.9



Area 14

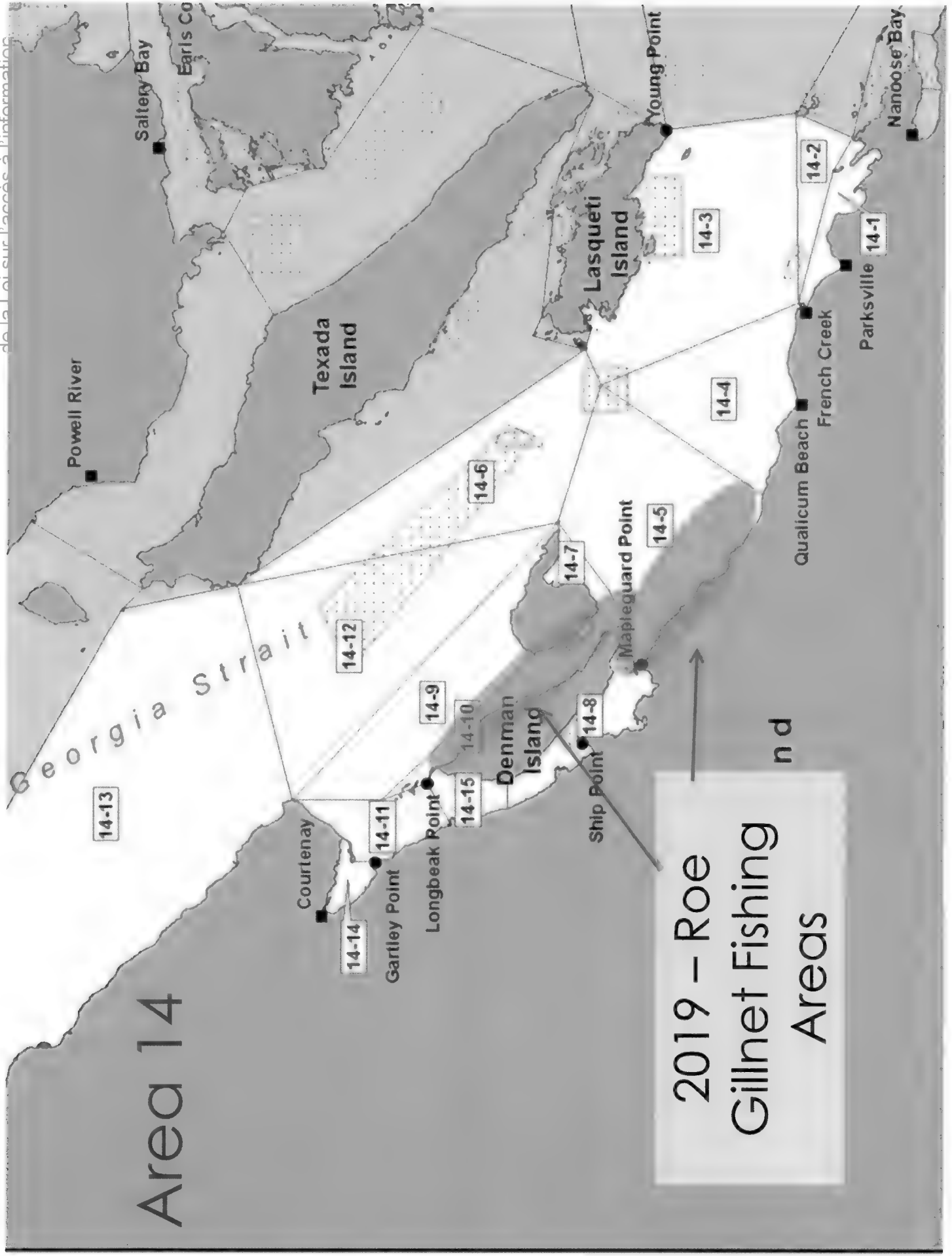
Vancouver Island

2019 – Roe
Seine Fishing

SOG Roe Gillnet Fishery - 2019

- Quota: 11,472 short tons
- Fishery Opening: March 15 to April 4, 2019
- Number of licences: 1,190
- Quota per licence: 9.640 short tons
- Licenced Pools: 14

Fishing Dates	Location	Landings (Short Tons)
March 15 – March 21 Apr 1	East Coast of Denman South Coast of Denman Vancouver Island Shoreline – Mapleguard Pt to Qualicum Beach Subareas 14-5, 14-7, 14-8, 14-10	8,373.7



SOG FSC & First Nations Communications 2019

- FSC Allocation: 35 short tons
- Fishery Opening: Year-round
- Herring Communications Coordinator: Information sharing
 - spawn observations
 - commercial fleet fishery updates
 - Test activities
 - Staging of FSC and access

➤ Issue with commercial gear and FSC gear impacts in Denman island area this season.

SOG Quota & Catch (Short Tons) 2019

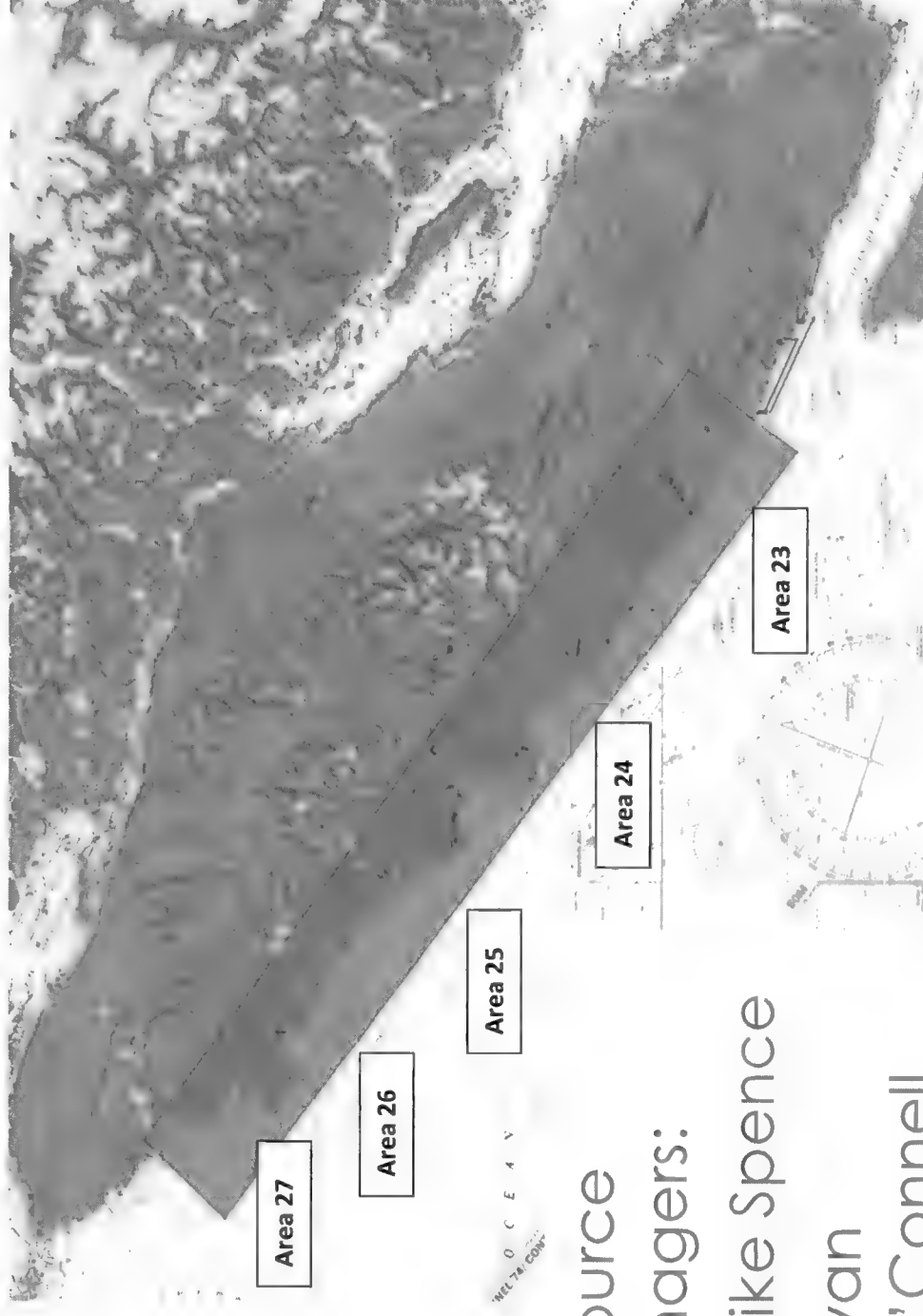
Fisheries	Quota	Catch
Food and Bait	7,710	7,503
FSC*	35	3
Special Use*	902	540
Roe Seine	8,311	7,178
Roe Gillnet	11,472	8,374
TOTAL	28,430	23,598

*Based on reports to-date, final catch numbers not available.

Discussions

- Areas with lack of recently observed spawn continues.
- Shellfish sanitary contamination in Baynes Sound in 2017 and 2018 – fleet adjustments and in season measures
- Drone use in close proximity to fishing vessels safety concern
- Sea Lions
 - Impacts to stocks, harvesters, fishery and safety
 - Impacts to sea lions (e.g. use of deterrents) and contravention of Marine Mammal regulations.

Stock Assessment Area – WCVI, Areas 23-27



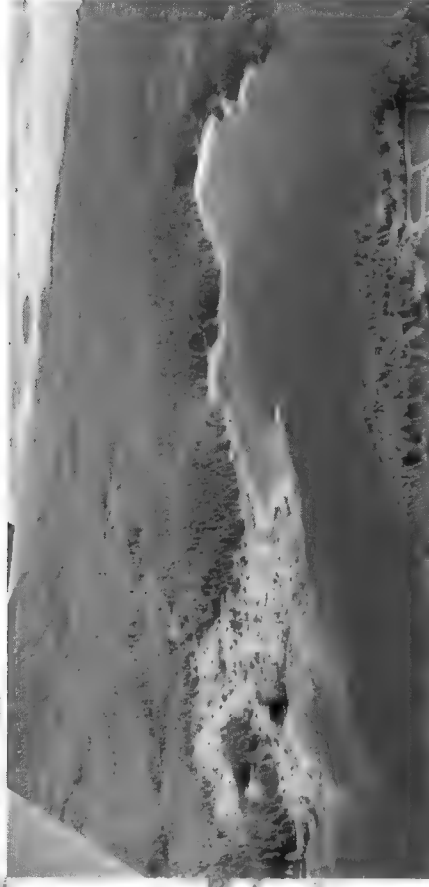
Resource Managers:

- Mike Spence
- Ryan O'Connell

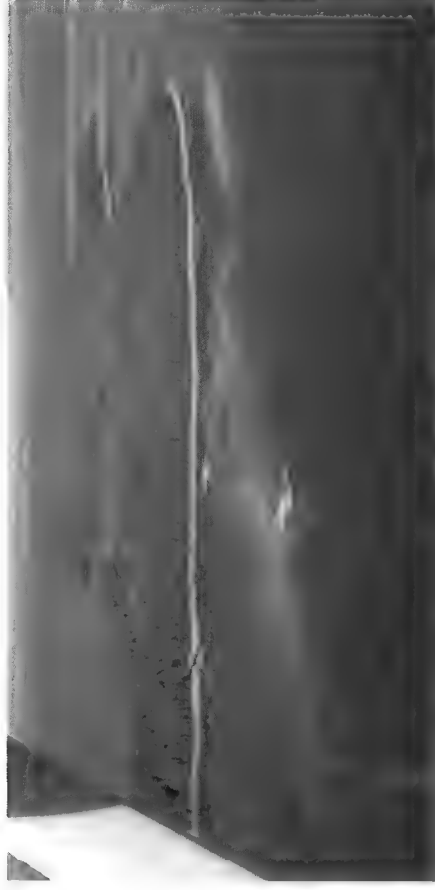
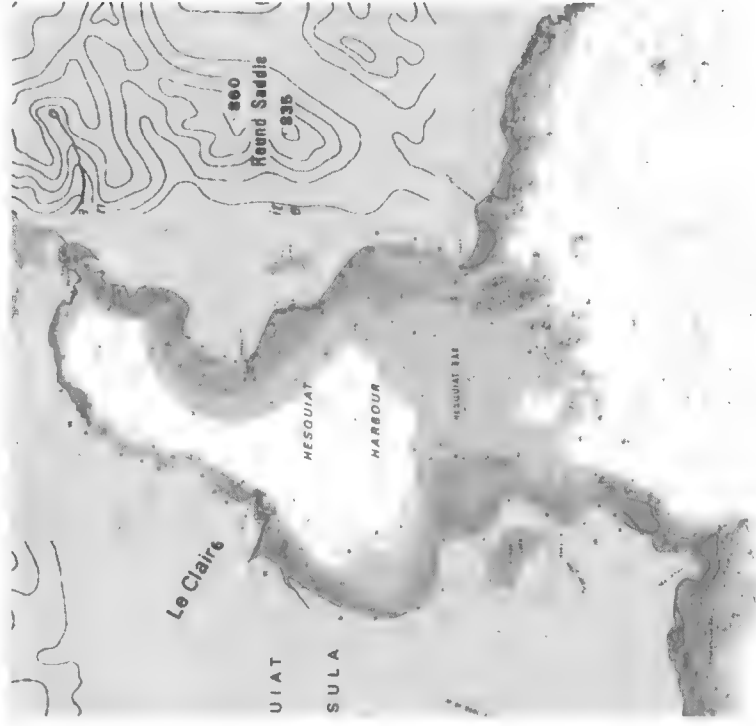
Area Resources

- Test vessel:
 - Proud Canadian - 20 days
- Dive charters:
 - Vessel Based: Pachena No.1 – 20 days (1 day extension)
 - Shore Based: Seaveyor 1 – 15 days (combined with SOG)
- Spawn aircraft flights: 10
- Satellite imagery project 2018 and 2019 images
- First Nations reconnaissance surveys:
 - Area 23 – 15 days ([REDACTED] , Toquaht FN)
 - Area 24 – 29 days ([REDACTED] , Hesquiaht FN)
 - Area 25 – 16 days ([REDACTED] , MMFN, Nuchatlaht Tribe (Esperanza); ([REDACTED] , NTC)

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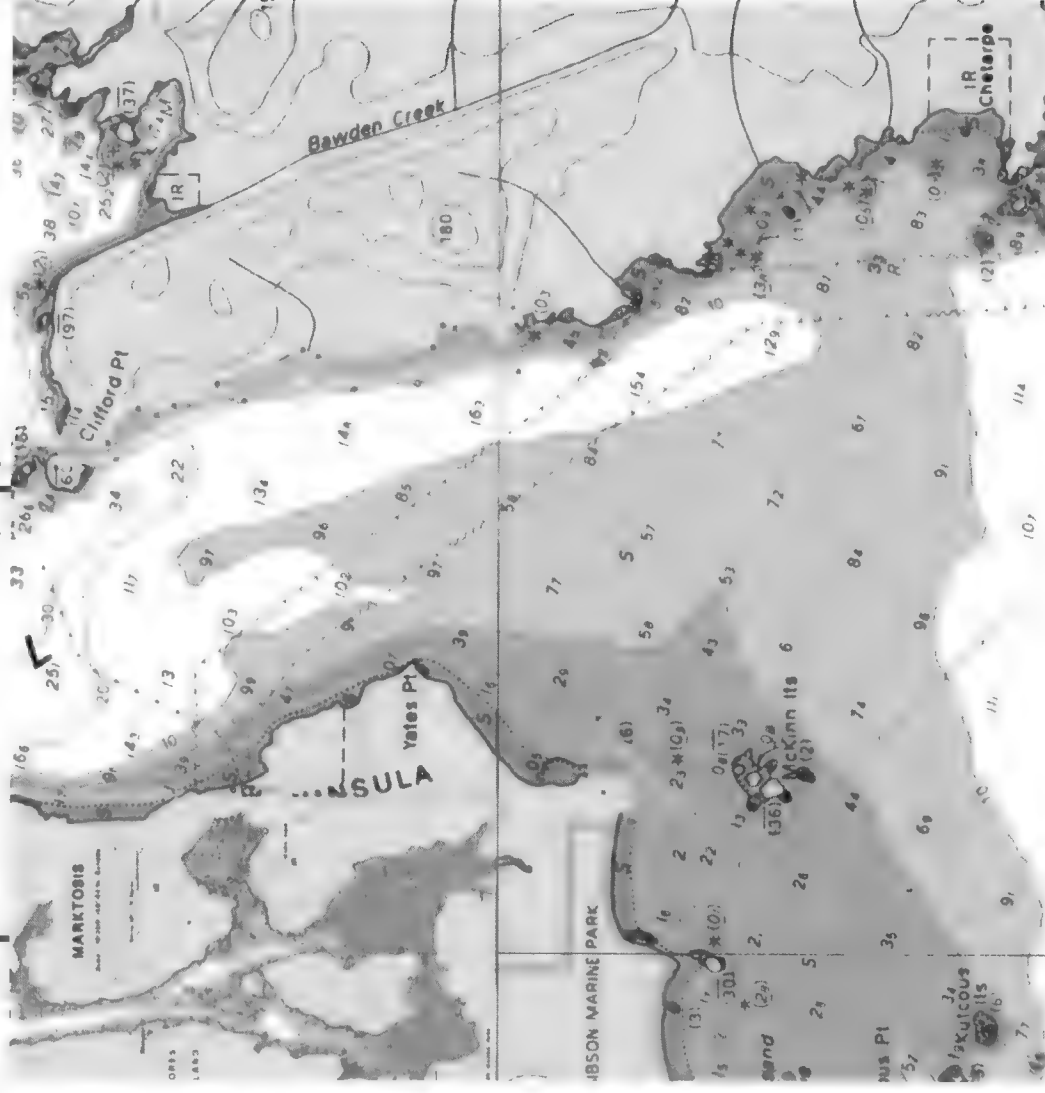


Area 24 Spawn Map

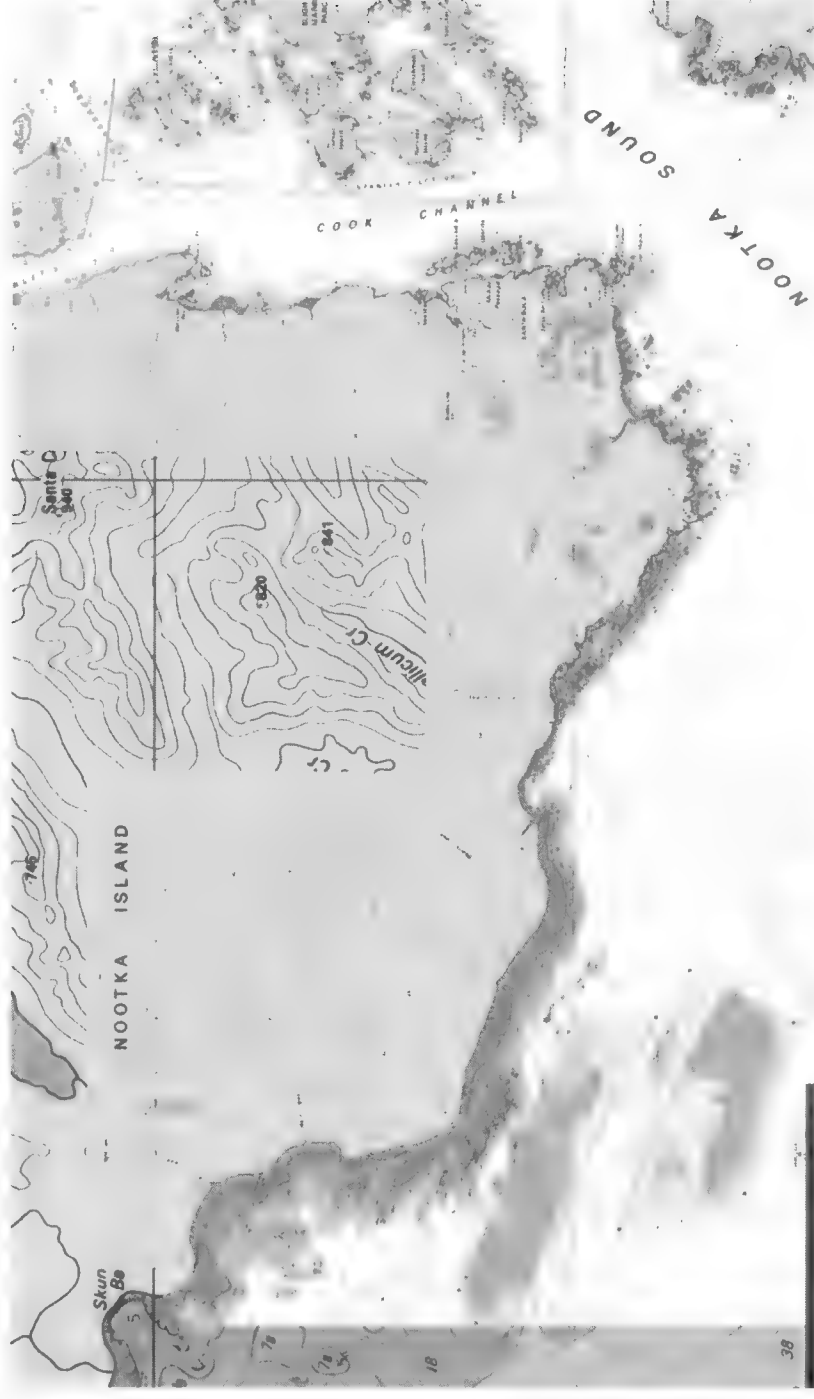


- Jan 15 – Mar 29 (7 days) • 3 samples - seine test
- 4000 tons sounded
- 9.4 miles (spawning activity)
- Vessel dive survey

Area 24 Spawn Map

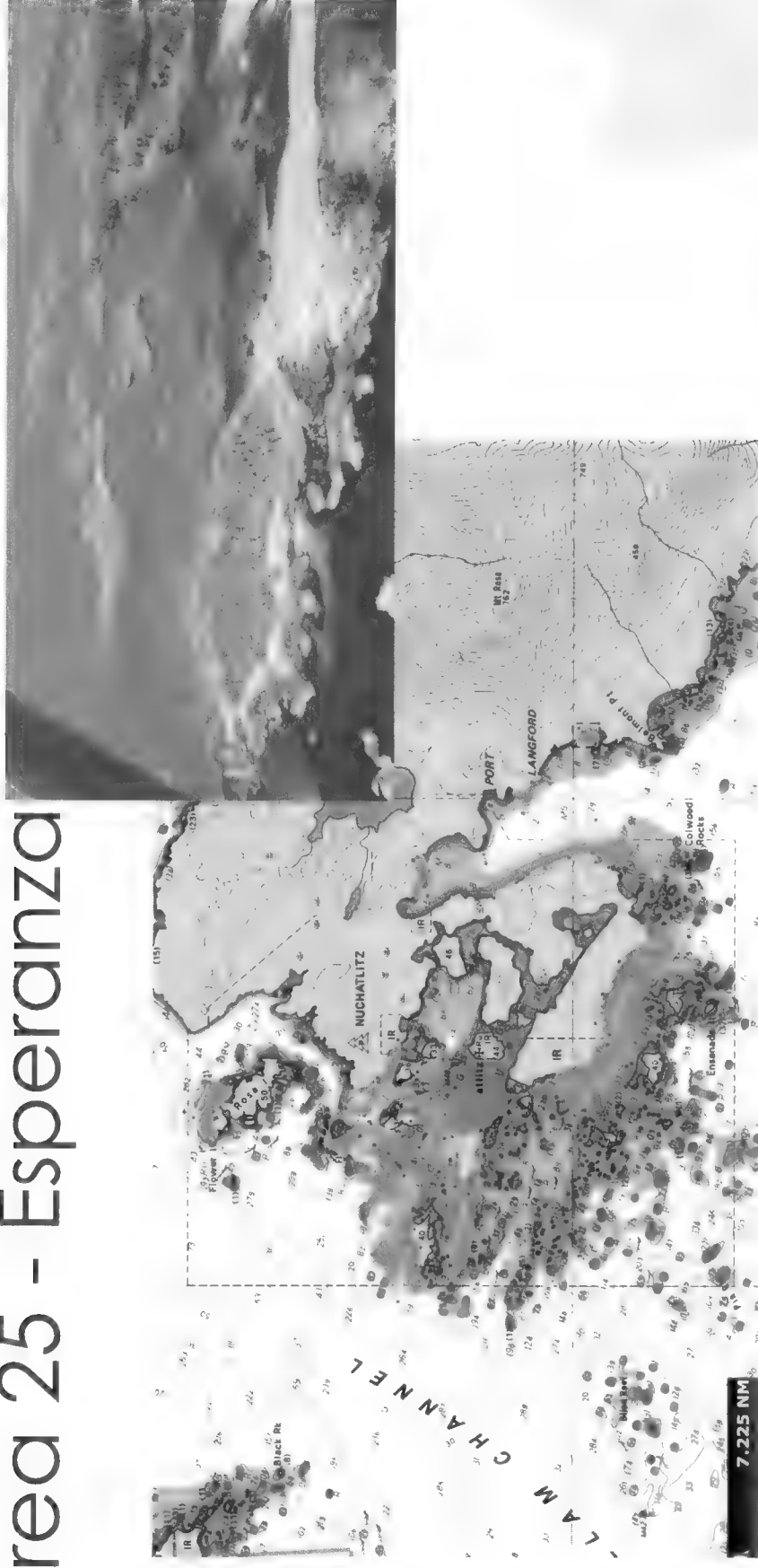


Area 25 - Nootka



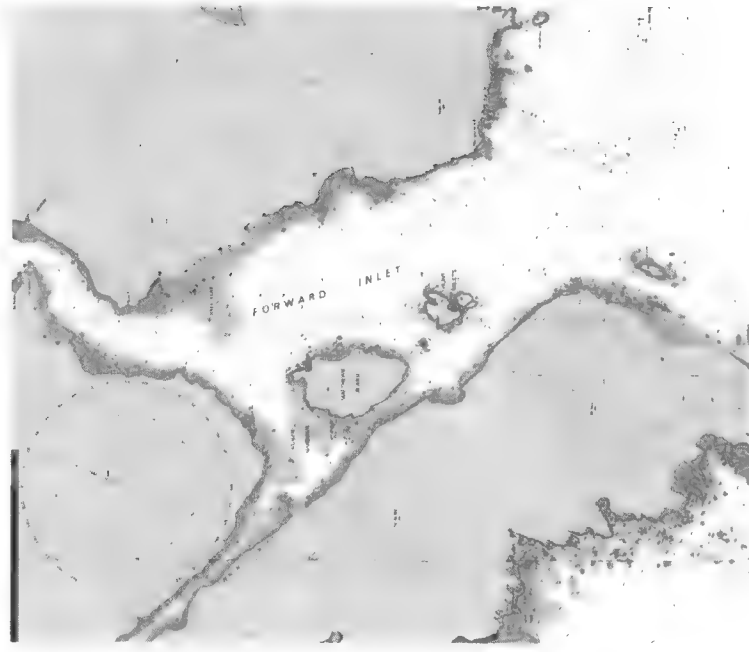
- Mar 5 – Mar 16 (7 days)
- 9200 tons
- 8.01 miles (spawning activity)
- Vessel & Shore based dive survey
- 5 Seine test samples
- Later fish sounded Mar 20 no spawn reported

Area 25 - Esperanza



- Feb 28 – Mar 27 (8 days)
- 2800 tonnes
- 7.2 miles (spawning activity)
- Vessel based dive survey
- 3 Seine test samples

Area 27 Spawn Map



- Mar 20 – Mar 28 (2 days)
- 2.3 miles (spawning activity)
- Shore based dive survey
- Dive survey reported mass die off of eggs

WCVI - Fisheries

FSC

- Area 23 - Tseshaht & Hupacasath First Nations
Area 23 - Maa-nulth First Nations Treaty Fisheries
- Area 24 - Tla-o-qui-aht, Ahousaht, and Hesquiaht FN
- Area 25 - Mowachaht/Muchalaht, Ehattesaht, and Nuchatlaht FN
- Total of 3000 pounds of round herring reported harvested by WCVI First Nations.
- Spawn on boughs and trees activity reported in Area 23 & 24 with poor success.

Commercial

SOK Area 23/24 – 2 licences; Area 25 – 2 licences No harvest since 2006

Area 27 – 3 licences - did not set up- no harvest

Roe (Seine/Gillnet): No harvest since 2006

T'aaq-wiihak (on-going negotiations)

Central Coast Area

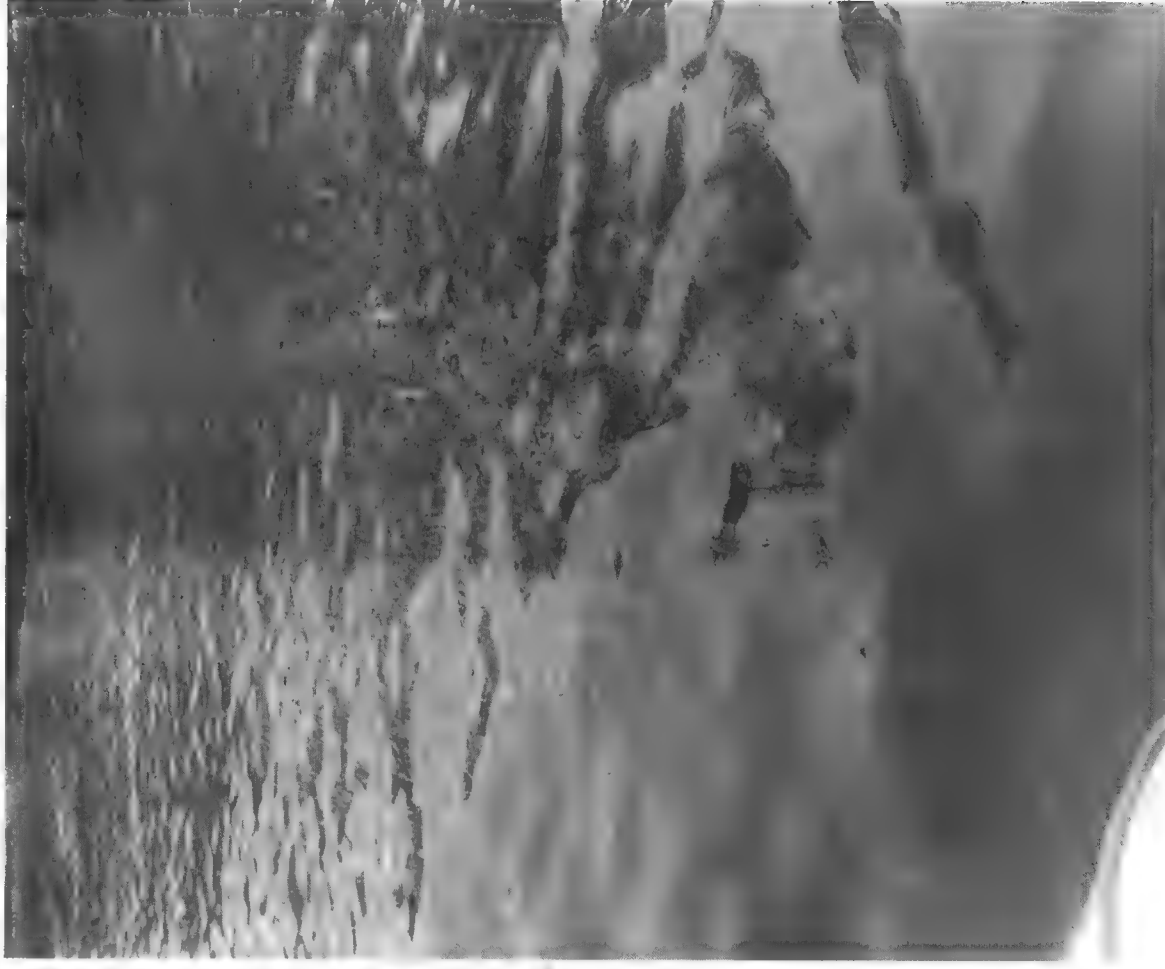
Areas 6,7,8

and also Area 10

Resource Managers:

Kristen Wong

Bradley Koroluk



Canada

2019 Stock Assessment Resources

- Management Platform: CCGS Vector (Mar 17-Apr 4)
- Dive charters: Ocean Cloud (Mar 27-Apr 14)
- Pachena No 1 (Apr 2-19)
- Test vessels: Windward Isle (Mar 19-Apr 9)
- Spawn Overflights: (Mar 21, 24, 28, 31, Apr 4, 2019)
- GN Sounding Platforms:
 - Lady Raven: Mar 19 – 27
 - Royal Jazz: Mar 22 – Apr 3
 - Three Girls II: Mar 19 – Apr 5

Central Coast Area Spawn Flight Observations

- Good flying conditions, clear and sunny.
- Few signs of wildlife, birds for most of the season other than active spawn.
- 5 Flights: March 21, 24, 28, 31 and April 4
- Major spawn locations heavily spawned by end of March, only a few isolated spawns noted/reported in April.

Central Coast Area – Dive Survey Estimates

- Central Coast Total - 96 nautical miles (178 km)
- Area 6 - 21 nm (39 km)
- Area 7 - 67.5 nm (125 km) consistent heavy spawn
- Area 8 - 7.5 nm (14 km)

PFMA 6 - Spawn Flight Observations

21 NM spawn activity observed
Test samples (1)

Spawn started March 18 in Kitasu Bay, then
started again 5 or 6 days later. Continued
for several days throughout the entire bay
and into Meyers Pass

DIVE SURVEY RESULTS

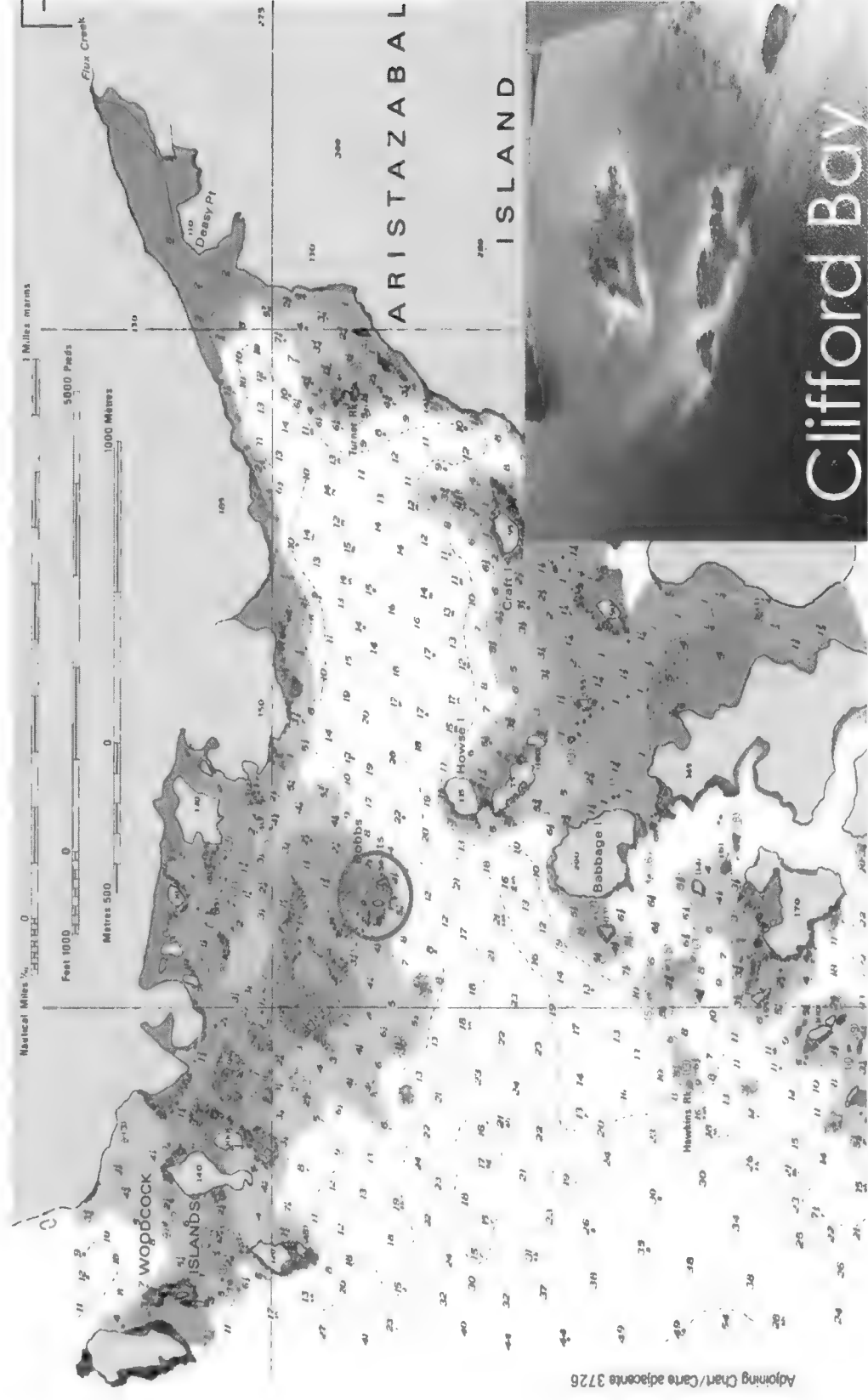
Area 6 spawn total 21 nm (39 km)

Kitasu Bay - 12.5 nm (23 kms)

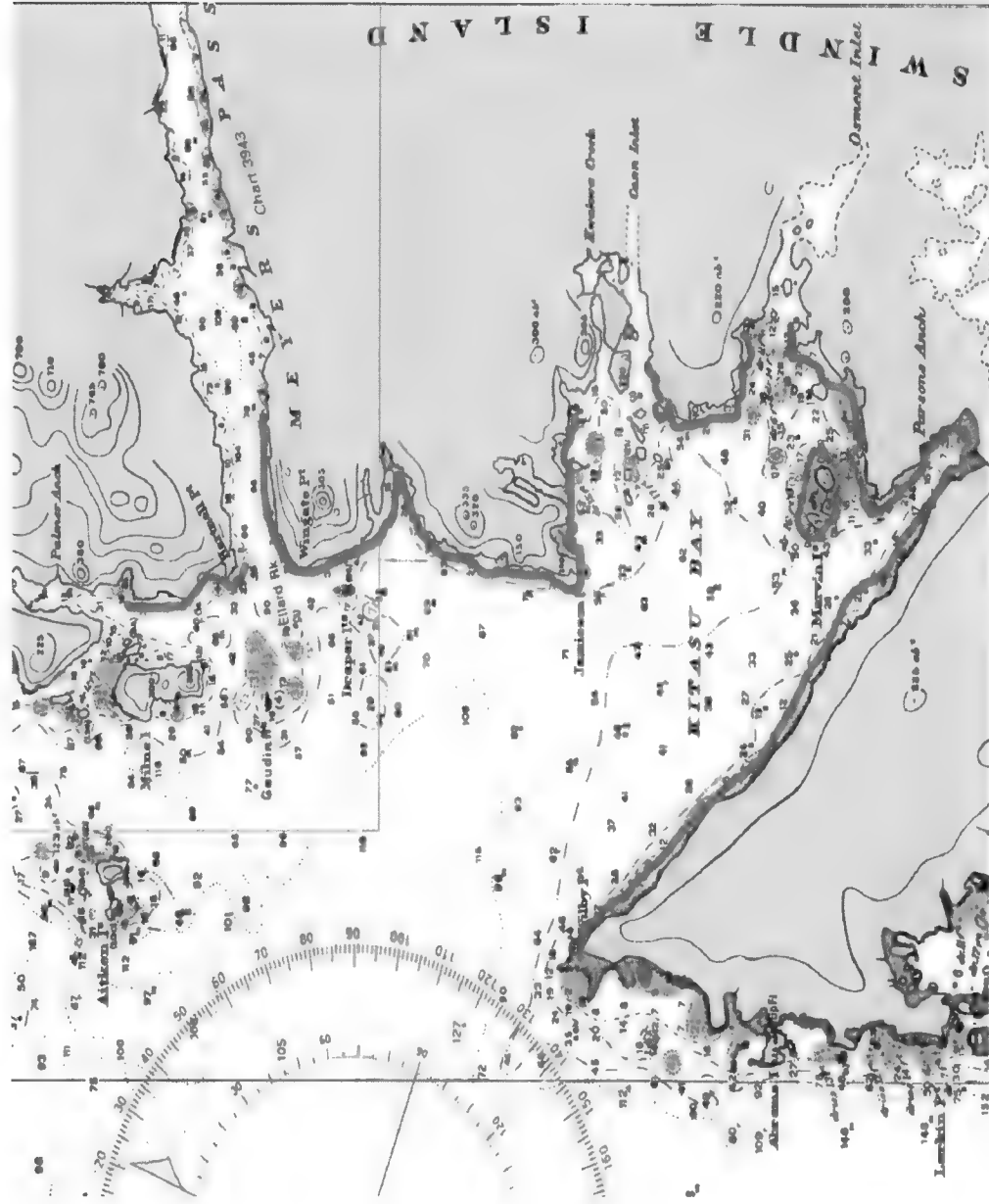
heavy spawn 2 - 3 layers average up to
15+ layers

Meyers Pass, Meyers Narrows, Thistle Pass -
8.5 nautical miles (16km)

PFMA 6 - Spawn Observations



PFMA 6 - Spawn Observations



Central Coast – Area 6 & 7-3 SOK Fishery



of Licences and Areas fished:

- Three closed pond licenses pooled
- Operations in Kitasu Bay & East Higgins

Landed:

- Met quota

Fishery Start:

- Mar 18, 2019

Validation Start:

- March 29, 2019

- The 3 licences (J15, FJ17, J28) were pooled again this season.
- There were 6 ponds set-up in Kitasu Bay (2 in Parsons Anchorage and 4 around Marvin Islands) between March 18 & March 31. Three deliveries at Kitasoo Seafoods in Klemtu.
- One pond was set-up in East Higgins between March 31 and April 8.
- One delivery was validated in Prince Rupert.

PFMA 7 - Spawn Flight Observations

70 NM spawn activity observed

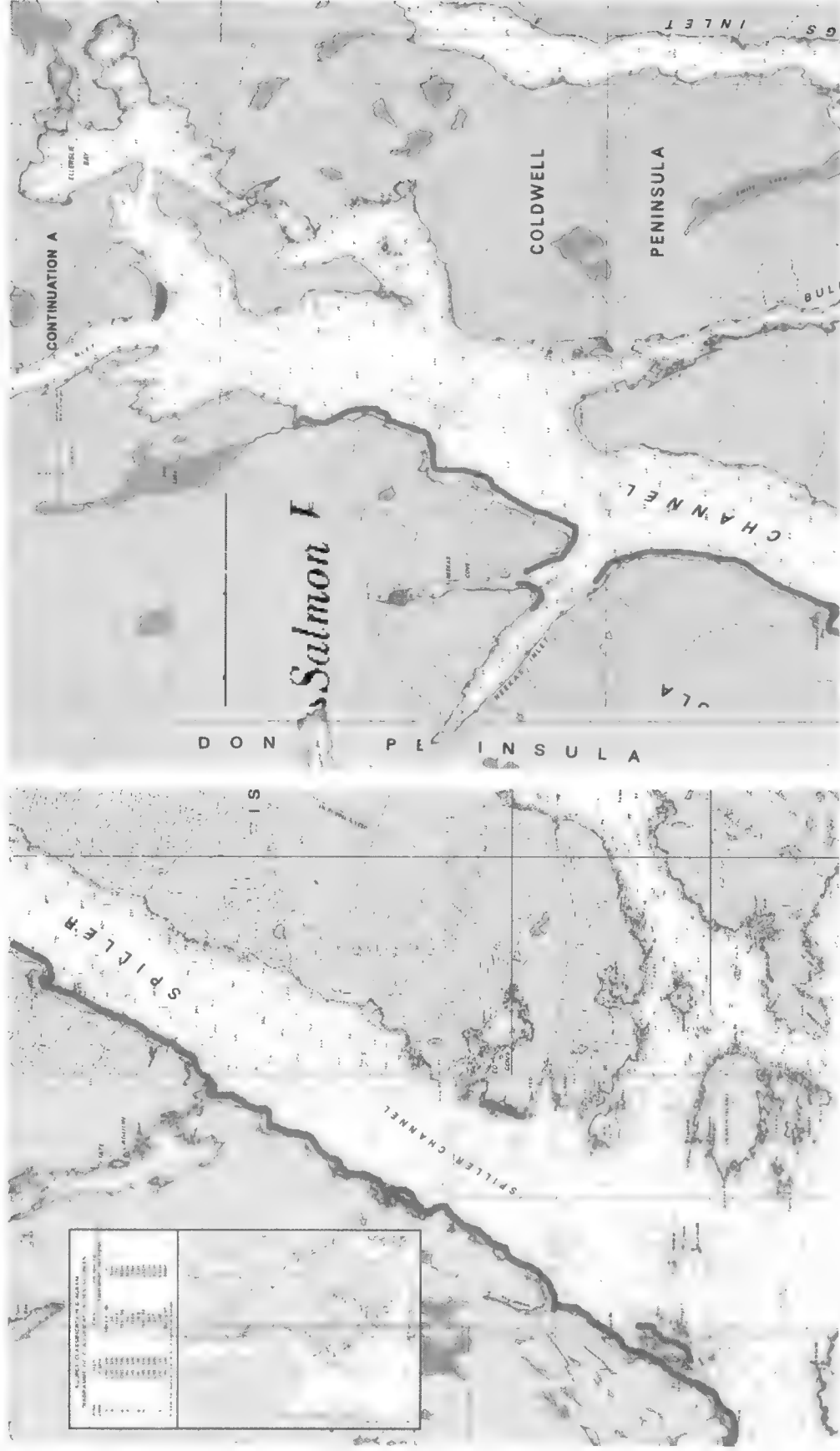
Test samples (6)

Area 7 spawn total 67.5 nautical miles (125 km)

consistently heavy spawn

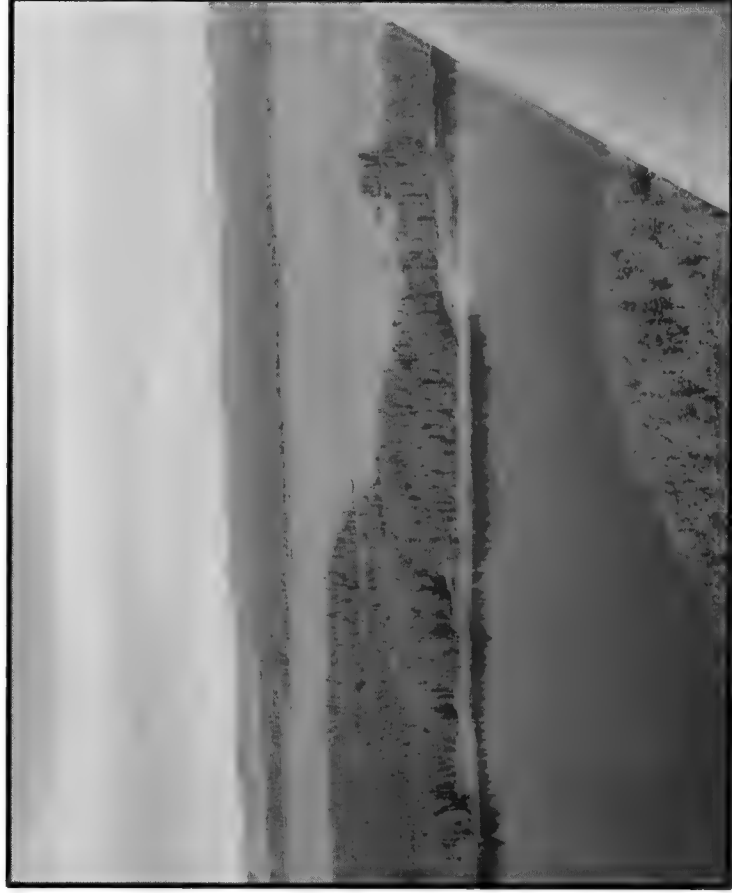
- Spiller Inlet 4.5 nm 2-3 layers heavy
- Ellersley Bay 2.5 nm 2-3 layers heavy
- Spiller Channel - Yeo Island shore 7nm 2 layers average
- Spiller Channel - West shore including Boote Is, Neekis inlet and Neekis Cove 27 nm 2-3 layers average coverage
- Spiller Lagoon - 4nm 2 layers average
- Seaforth Channel, Watch Is - 5 nm
- Norman Morrison - 4.5 nm lighter spawn
- Mathieson Channel, Kynoc Inlet, Culpepper Lagoon, East Higgins and Idol Point - 13 nm total

PFMA 7 - Spawn Observations





Central Coast – Heiltsuk SOK Fishery in Area 7



Heiltsuk SOK Quota Target:

- 304,000 lbs *Macrocystis*,
- 12,000 lbs *Egregia*

Landed:

- *Macrocystis* quota met
- no *Egregia* harvested this season

Fishery Start: March 20, 2019

Validation Start: March 26, 2019

Harvesting activities began March 25, validations from March 26th to April 2nd.
The Heiltsuk SOK Committee officially closed the 2019 Heiltsuk SOK fishery at
7:09 pm on April 3rd.

PFMA 8 - Spawn Flight Observations



7.5 NM spawn activity observed
Test samples (3)

Photo Near Kwakhume Point

Kwakhume Point 2.5 nm light
spawn

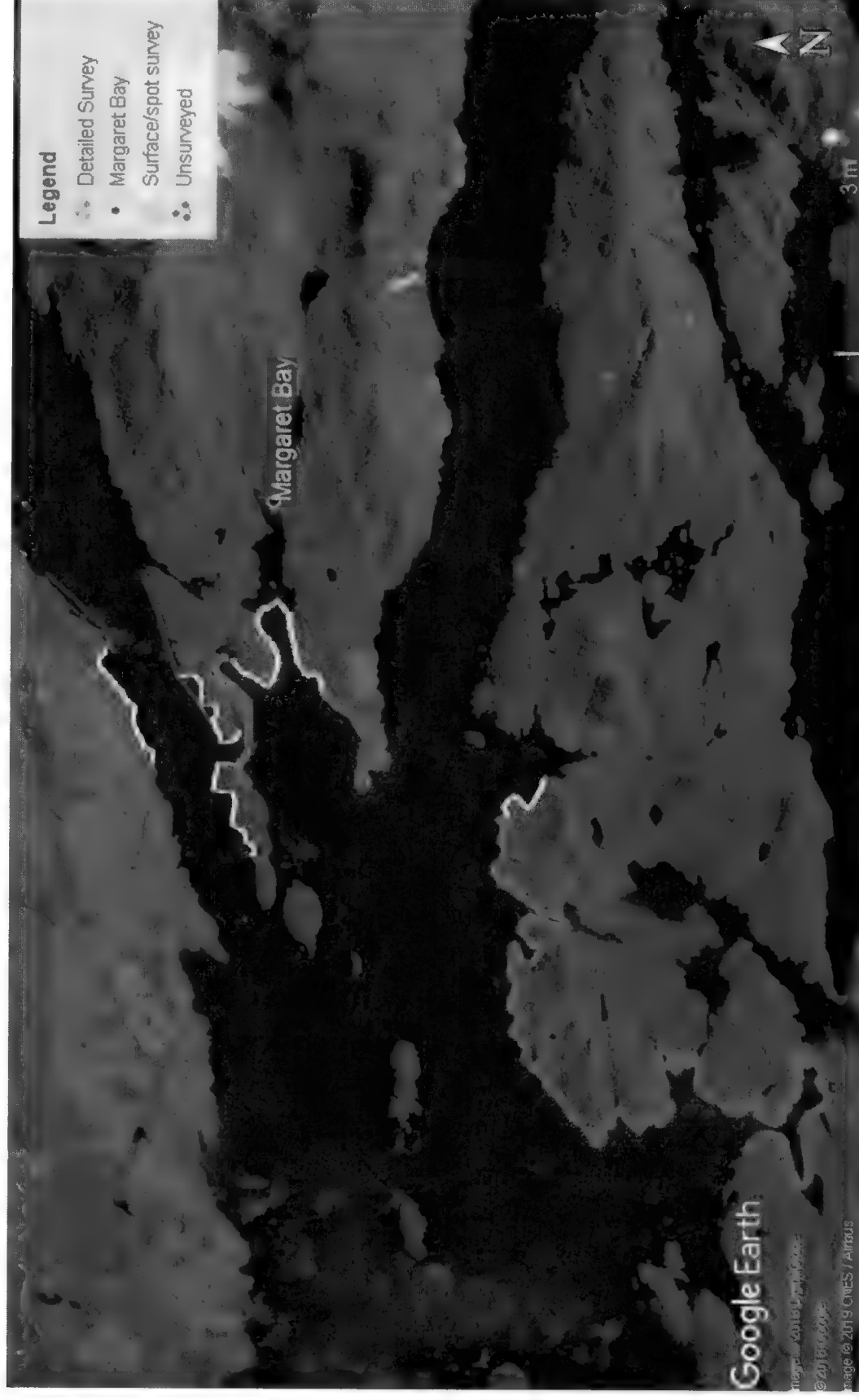
Pruth Bay 2.5 nm 2 layers average
Mustang Bay - 2.5 nm heavy spawn
in the head of bay, light on
perimeter

One mile of spawn in the bay
above Whitby Pt.

Central Coast Area Notes

- Spawn early in general, Kitasu Bay said to be earliest in two decades. One initial spawn with no backing fish, then additional extended spawn 5 or 6 days later.
- Shoreline assessment opportunities could include use of a ROV from CCG Vector.
- Satellite images could be used in 2020 for spawn?
- Collaborative work with HIRMD herring program was very successful. Thanks to all the staff.

PFMA 10 – Summary of Spawn



Central Coast – Area 10 SOK Fishery



of Licences and Areas fished:

- Two open pond J licences and one closed (option to open pond) J licence in the area
- One open pond licence operated in the area this season

Landed: limited

Harvest date: March 24 & 25, 2019

Validation date: March 26, 2019

Commercial Spawn-on-kelp (SOK) opportunities were provided in Area 10, under a precautionary management approach.

Licence J4 set their open pond lines in Mud Bay this season. J4 2019 quota was 18,000 lbs. As a precautionary approach to this season, the operator set a limited number (~700) of kelp fronds on their lines and only harvested those fronds with good quality coverage (~500). They harvested their product on March 24th & 25th.

The product was landed in Port Hardy on March 26th

PRD Area 2019

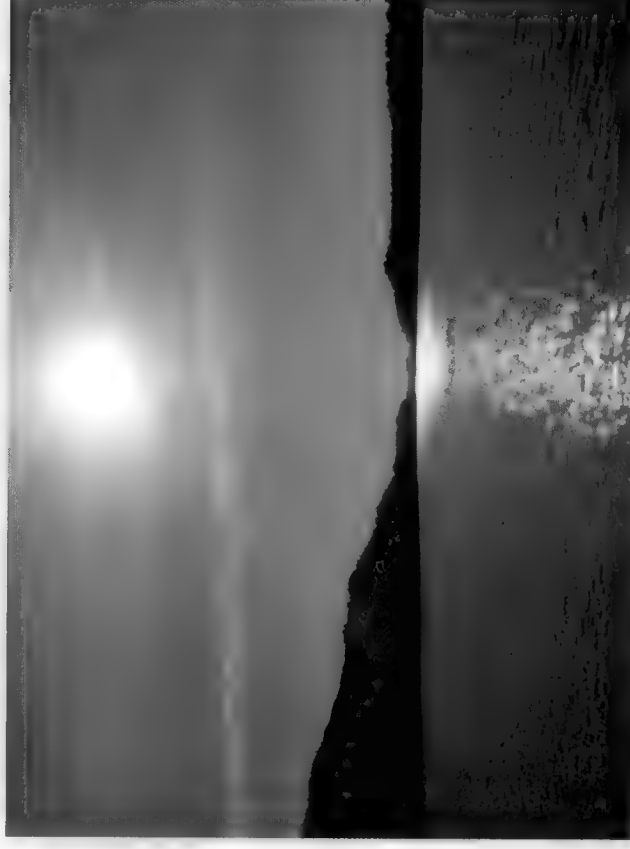
Big Bay Area 4 and
Kitatla Area 5

Resource Managers:

Jen Gordon

Corey Martens

Steven Groves

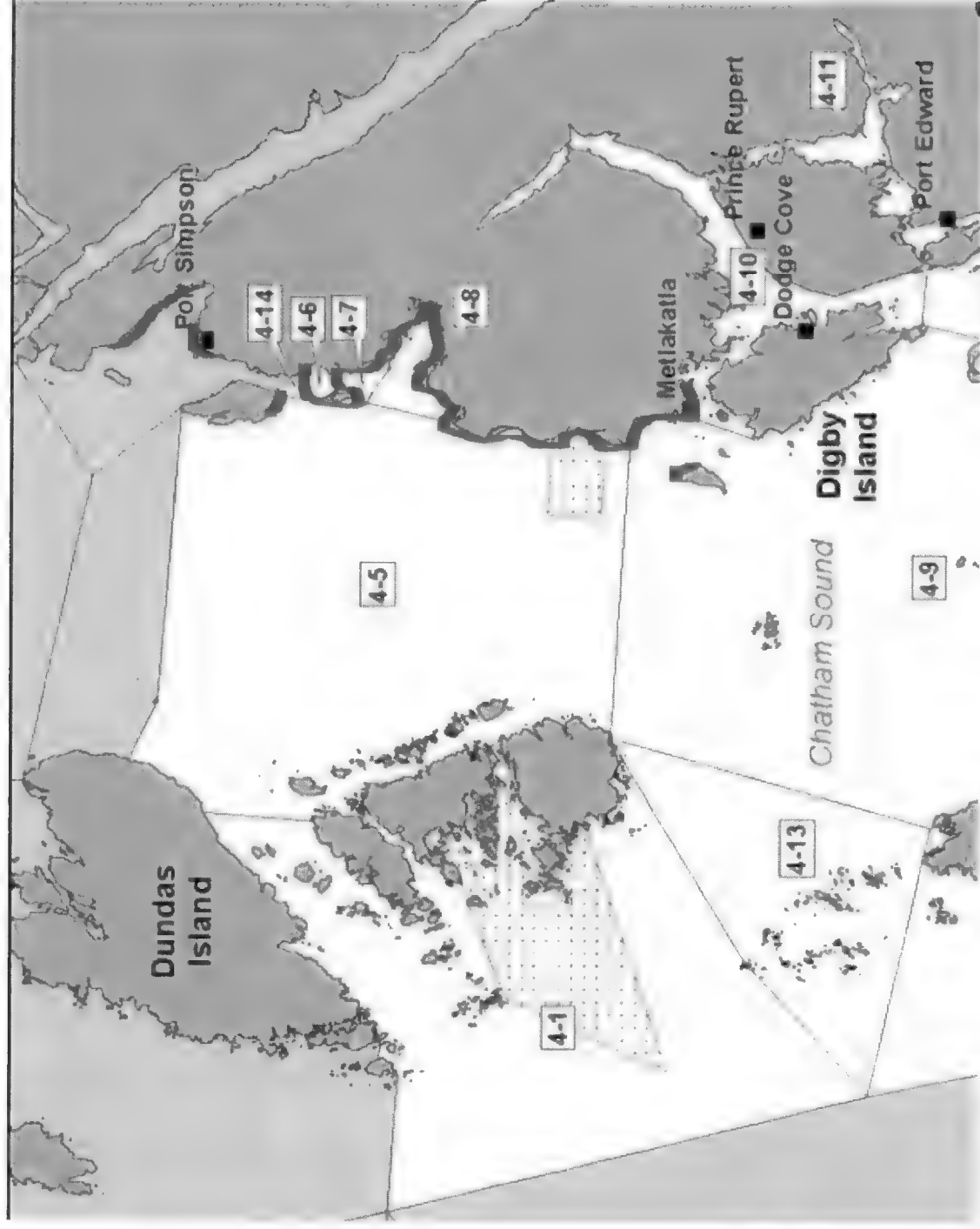


Stock Assessment Resources

Herring Coordinator: Corey Martens

- Charter vessel: Nita Maria
 - 13 day charter: March 15 - 28th.
- Splash 3+ Drone (waterproof) – pilot project
- Lax Kwalaams First Nation surveys
 - captured later spawn after the departure of the charter vessel.
- FSC and SOK fisheries only
- Sub-areas set aside for FSC fishing
- SOK - one operator with 3 licenses activated, no catch. Closed May 1

PFMA 4



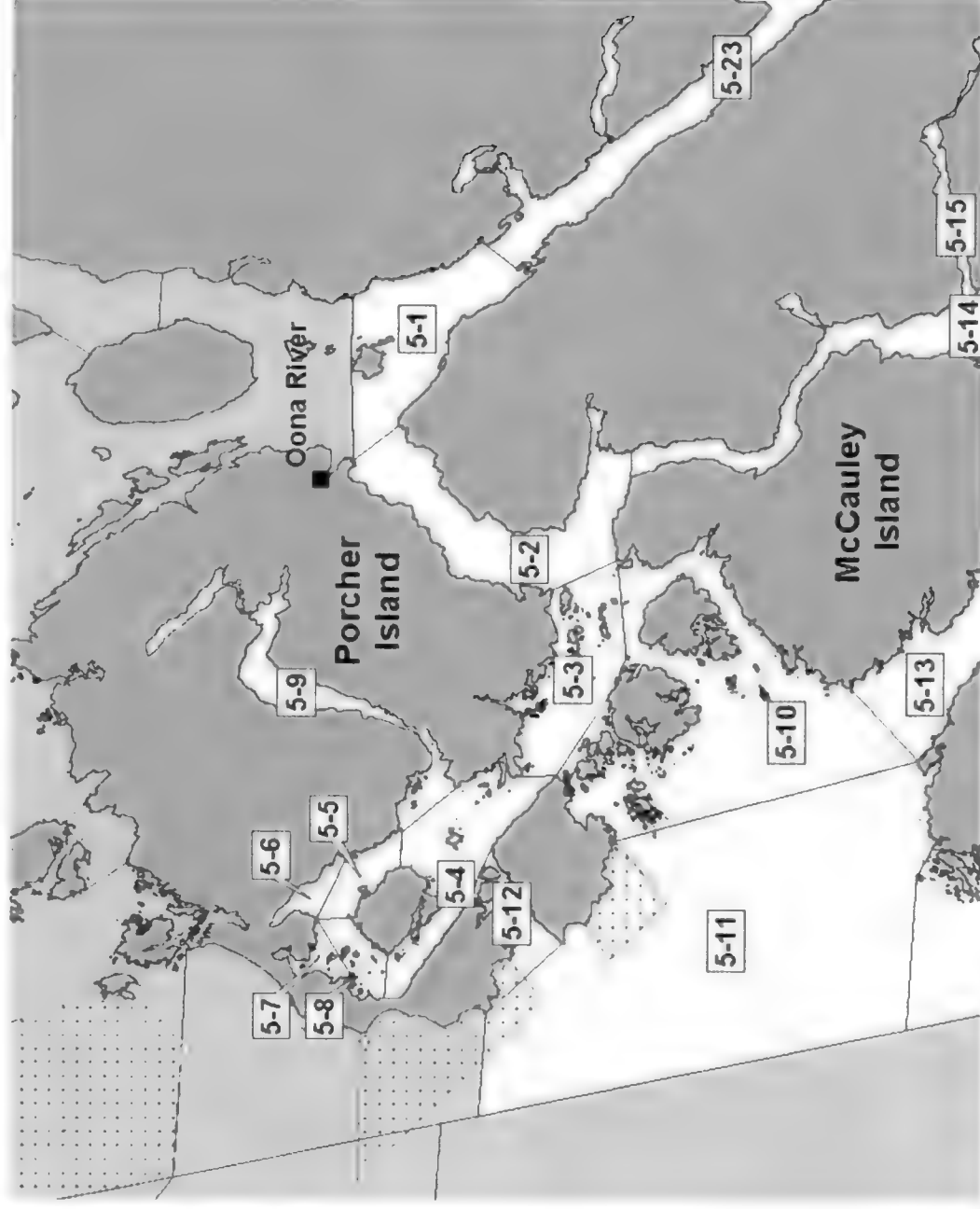
Area Notes

- Spawn timing (March 19th - Burnt Cliff Island) and location was similar to 2018. Spawn length increased for 2019 approx. 37 nm.
- All herring sampled were observed to be below cut-off (small).
- Lax Kwalaams Fisheries was very helpful in assisting with spawn location after the science charter was complete.
- Spawn in Big Bay assessment area was an improvement compared to 2018.

Discussion – Successes/ Challenges

- Use of the drone was very informative for locating and gauging abundance of herring in the shallows.
- The drone could be used to confirm spawn location , intensity and extent when the test boat or skiff cannot get to the beach.
- First Nations did not support the commercial SOK fishery.

Stock Assessment Area – 5



2019 Stock Assessment Resources

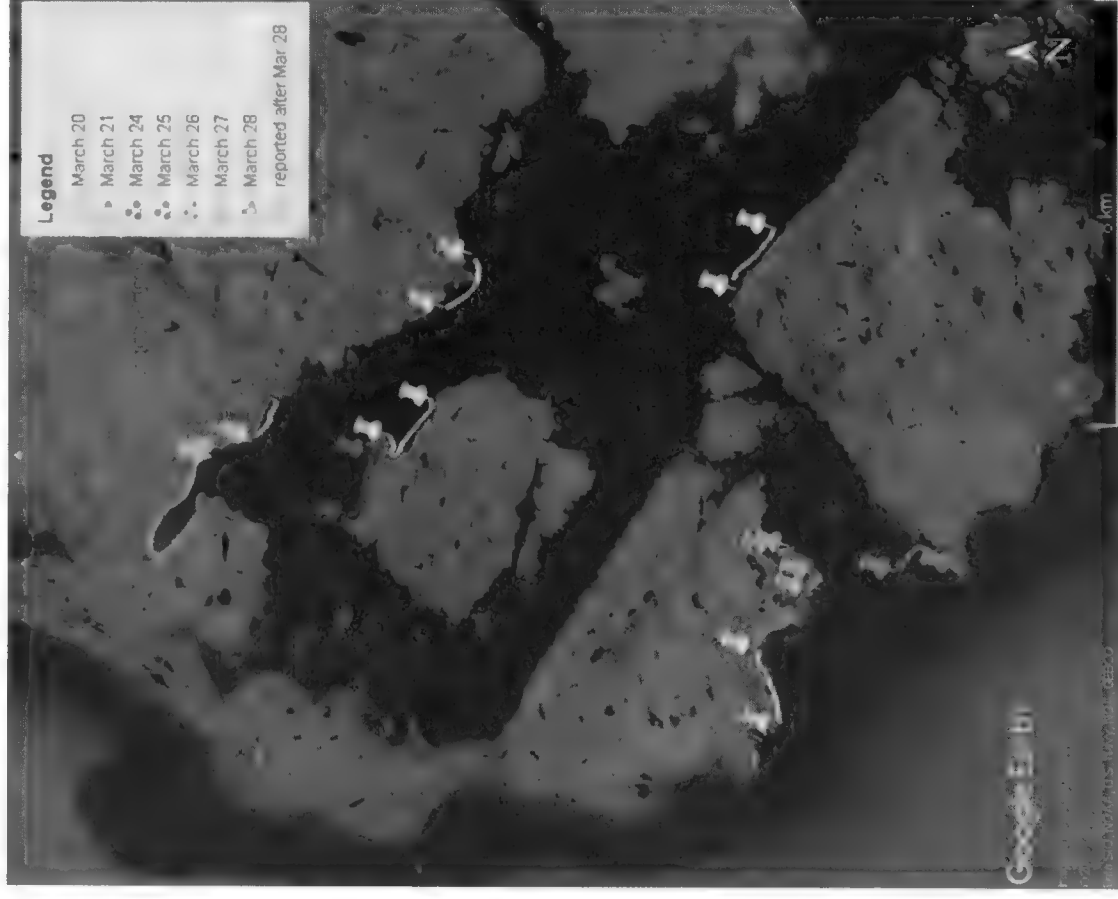
- Test Vessel:
Fransiscan #1
- Dive Vessel:
Royal Pride
- Gitxaala Environmental
Monitoring:
Gitxaala Spirit



Area 5 Spawn Observations

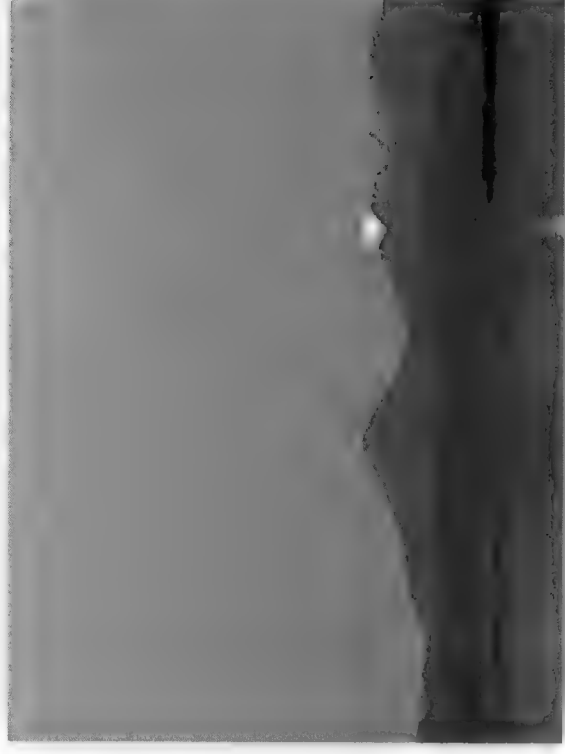
- 1st spawn observed at Dries Inlet on March 20th, then spread down to Kitkatla Creek.
- Large spawn outside of Freeman Pass.
- ~7.5 NM spawn activity observed.
- 7 test samples taken.
- Reports of spawn at Willis Bay and Banks Island prior to test fishery.
- Spawn reported to have continued and spread after test fishery.

PFMA 5 - Spawn Observations



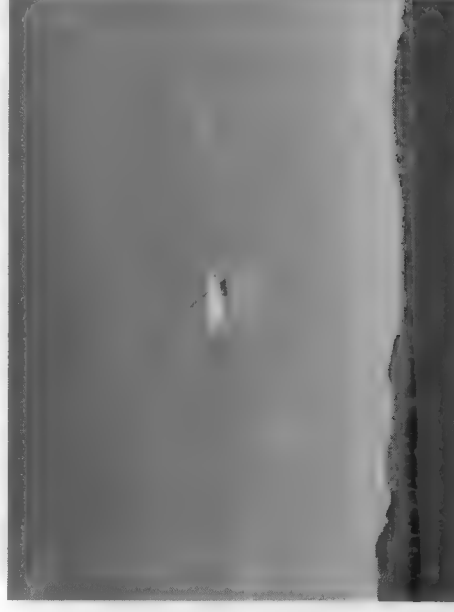
Area 5 - Fisheries

- Roe on Kelp
 - 5-1 to 5-12 open March 19 – May 31
 - 1 licence activated, 3 ponds + open ponding
 - March 31 – April 8
 - Fishing ongoing
- Gitxaala FSC
 - Open ponding
 - Roe on Kelp or Hemlock
- No seine fishery in 2019.



Area Notes

- 2019 was a good year for spawn – approx. 6500
† sounded from March 15 – 28.
- Locals refer to 2 waves of fish
 - Roe @ ~11% on March 15th; 2nd wave on March
28th - ?
- Did not have an opportunity to test the drone,
hopefully in 2020!



Haida Gwaii

Resource Managers:

Pat Fairweather

Peter Katinic

2019 Stock Assessment Resources

- Management Platform – None
- Roe Test Charter – Queens Reach Dive (March 9 to April 1)
- Spawn Recon. Charter – Victoria Rose (April 1 to 19) and Luxana (April 2 to 14 mentoring)
- HG Spawn Dive Charter – Haida Spirit (April 3 to 20)
- 2W Surface Survey Charter – Atlas (April 1 to 6)

Area Notes

HG

- Sounding relatively similar over past few years.
- Spawn deposition appeared to be higher than past few years based on increased spawned shoreline length and anecdotal reports of egg deposition.
- Unique this year was majority of Selwyn Inlet fish moved through Louise narrows and spawned in Carmichael Passage.
- Survey charters were generally effective and appropriate. May need some review or expansion of Dive charter if larger spawns continue to expand.

2W

- Soundings saw higher abundances in Port Louis
- Spawn was concentrated outside Port Louis in Otard Bay.
- Surface Survey Charter successfully surveyed Port Louis / Otard Bay spawn.

PFMA 2 - Observations

Soundings: (based on soundings)

HG Stock Area = 15,700 tons

→ 11 samples collected

2W Minor Area = 8,100 tons

→ 6 samples collected

Observed Spawn:

HG Stock Area

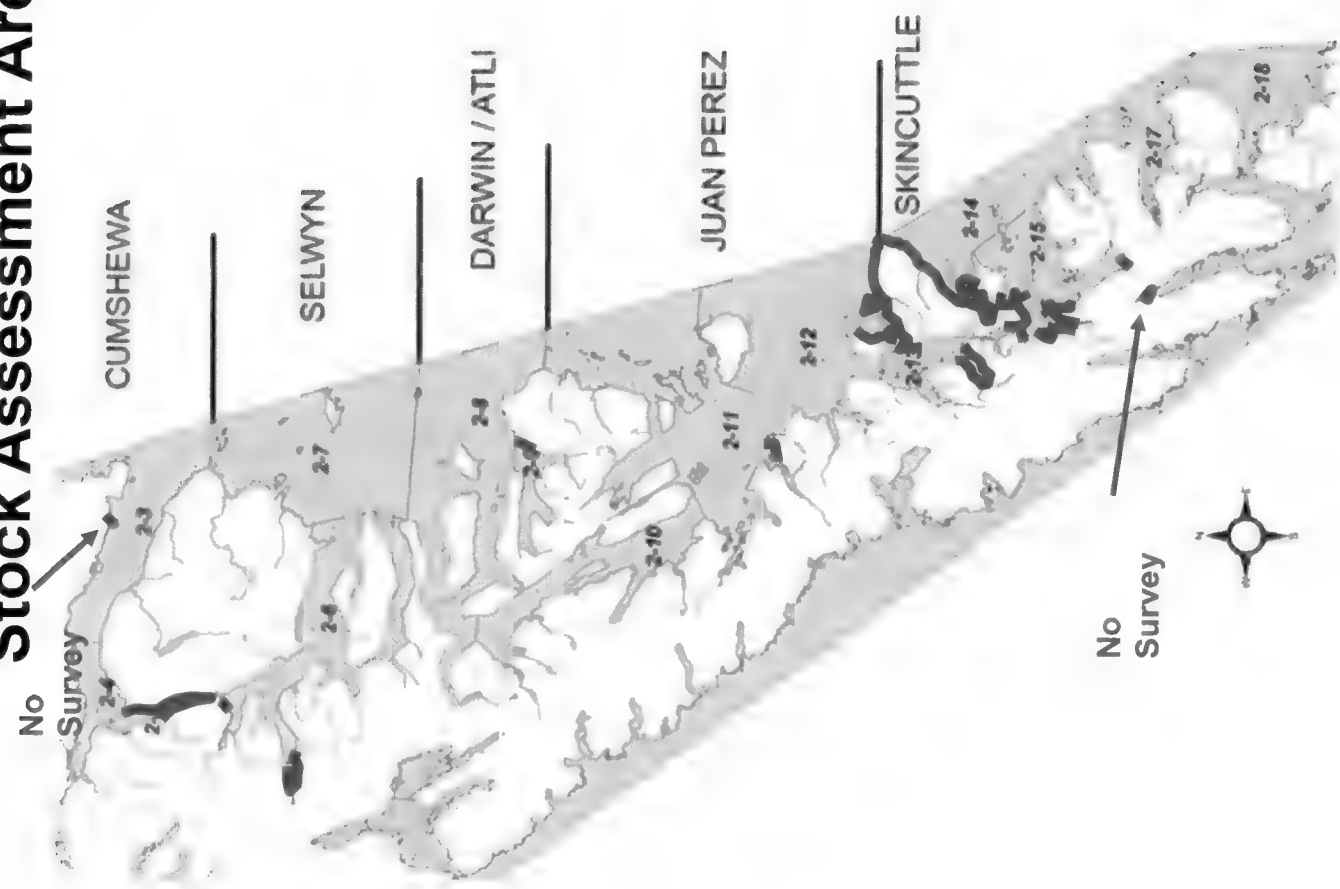
- Spawns observed March 25 to April 10
- 51.9 nmi (96.2 Km) spawn observed

2W Minor Area

- Spawns observed March 19 to April 3
- 6.3 nmi (11.7 Km) spawn observed



Haida Gwaii Stock Assessment Area



Location	Soundings	Spawn
Cumshewa Selwyn Inlet	1500 t	8.1 nmi (15 Km)
Atli Inlet	20 t	2.5 nmi (4.5 Km)
Juan Perez	5,200 t	2.6 nmi (4.9 Km)
Burnaby	3,500 t	28.4 nmi (52.5 Km)
Skincuttle Inlet	4,000 t	9.7 nmi (18 Km)
Louscoone Inlet	1,500 t	0.6 nmi (1.2 Km)
TOTAL:	15,720 t	52 nmi (96.2 Km)

Area 2W Minor Stock Area

Location	Soundings	Length
Otard Bay /Port Louis	5,700 t	5.2 nmi (9.6 Km)
Port Chanal	Scratches	1.1 nmi (2.1 Km)
Seal Inlet / Rennel Sound	700 t	No Survey
Kano Inlet	350 t	No Survey
West Skidegate	150 t	No Survey
Inskipp	1200 t	No Survey
TOTAL: 8,100 t		6.3 nmi (11.7 Km)



DFO Initiatives and Projects

May 2, 2019

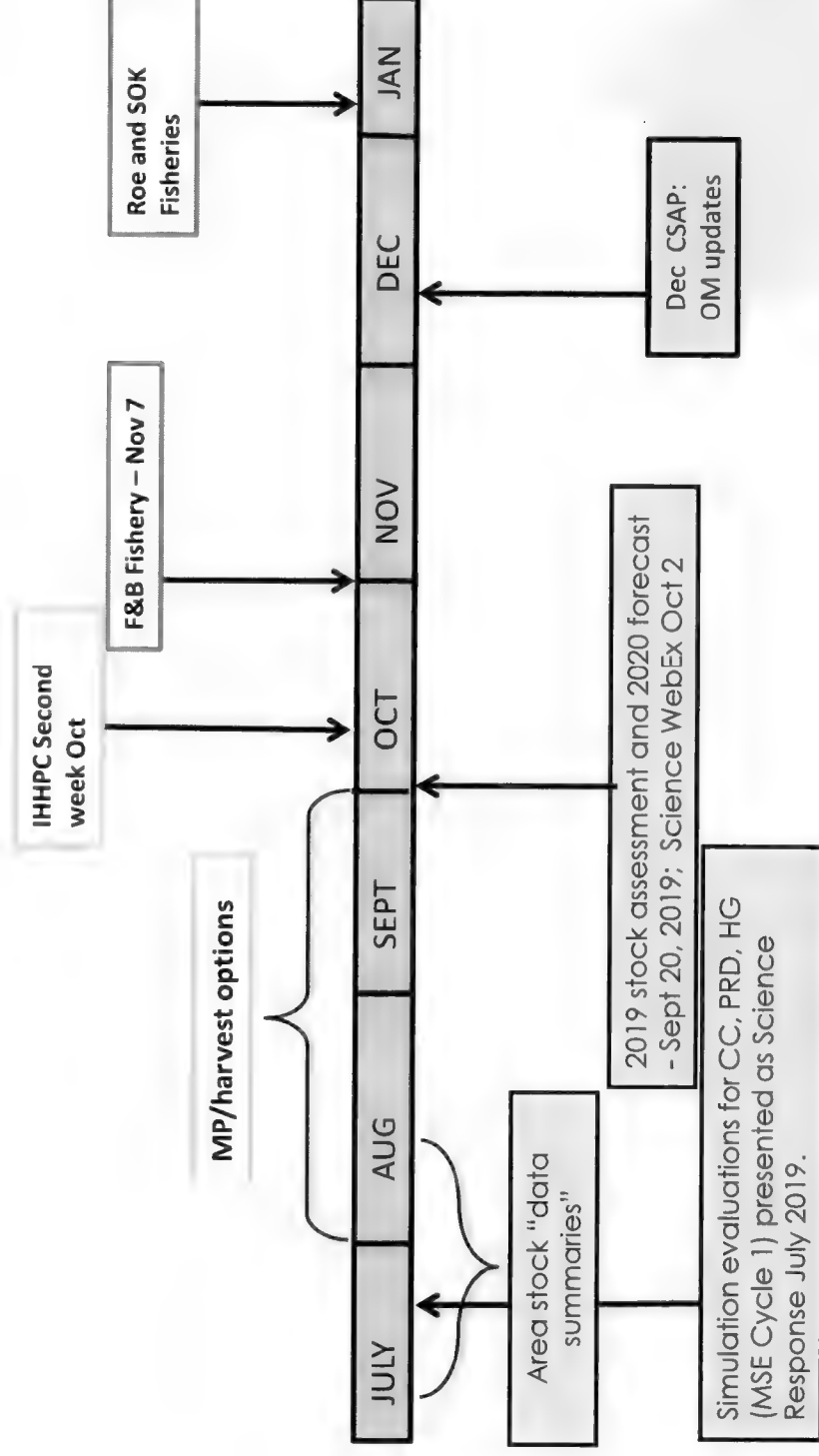
Update on Current DFO Priorities

- Pacific Herring Management strategy Evaluation
- Herring Communications
- Marine Conservation Targets & Marine Planning Initiatives
- Marine Mammal Regulations and Reporting
- Shark reporting
- Fishery Risk Assessments
- Fisheries Act Amendments
- Standing Committee on Fisheries and Oceans (SCOFO) Review
- Ghost Gear Initiative
- Norovirus/V. cholerae
- Southern Resident Killer Whale
- Reconciliation
- 5 Nations Negotiations
- Species at Risk
- Fraser River Chinook Measures

Management Strategy Evaluation

- Cycle 1: Simulation evaluations and application of MSE results for SOG and WCVI
 - Completed: July 2018 CSAS; work completed Sept 2018
- Cycle 1: Simulation evaluations and application of MSE results for PRD, CC, HG
 - Simulations to be presented as a Science Response (July 2019)
 - Results to be included in 2019 stock assessment (Sept 2019) and applied for 2019/20
- MSE Operating Model update (add SOK and fleet dynamics, changes to M, add some spatial dynamics)
 - Development will focus on HG/WCVI; with application to other stocks. CSAS review of OM changes in December, 2019
- HG Rebuilding Plan
 - Work underway, due Dec 2020

2019 Plan: Key Dates/Decision Points



2019/20 Meetings Planned

Date	Meeting/Decision
May 1/2	IHPC and HIAB Post-Season Meetings
May 10	Aquaculture-Herring Notovirus Dialogue Meeting
May 23	Maa-Nulth Post-Season Review Meeting
May 28/29	MSE Objective and Fishery Planning: Metlakatla, Lax Kw'alaams, Kitkatla First Nations
May/June (tentative)	Central Coast Nations MSE Meeting - placeholder
May/June (tentative)	Strait of Georgia Nations MSE Meeting - placeholder
May/June (tentative)	Nuu-Chah-Nulth MSE Meeting - placeholder
May/June (tentative)	HIAB MSE Meeting - placeholder
June 11	Conservancy Hornby Island/Association of Denman Island Stewards/Pacific Wild Meeting
June 19	IMAWG Strategic Planning Workshop and Annual Governance Meeting; Discussion of Annual Planning Priorities
July 10/11	Haida Gwaii Rebuilding Plan Working Group Meeting
July (tentative)	Area 10 Post-Season Review and 2019/20 Planning Meeting - placeholder

2019/20 Meetings Planned

Date	Meeting/Decision
August (tentative)	Individual Area Stock Summary Review and Early Advice Calls – placeholder (multiple)
September 20	Science Response for CC, PRD, and HG with MSE Cycle 1 results
October 1	Webinar with IHHPC/HIAB to review Science Response Herring Post-Season Week
October 7-10 - Proposed	October 9: HIAB October 10: IHHPC
October (tentative)	Conservancy Hornby Island

~Discussions on schedule or process~

Herring Communications: 2018 and 2019

- More than 100 letters received, with a focus on the roe fishery in SOG
 - First Nations
 - Commercial Industry and harvesters
 - Conservancy groups
 - Public, recreational harvesters, local residents
- Online petition with >80,000 signatures
- DFO conducted numerous interviews and communications with various media sources

What We Heard

- Support for continued MSE work
- Area or coastwide stocks are in low state and do not support commercial fisheries
- FSC needs are not being met due to low or poor distribution
- Public comment period inaccessible as it falls over the holiday
- The impacts of fisheries on local populations and the broader ecosystem need to be better understood
- The stock assessment uses a biomass baseline that is a fished state(not historic levels)

What We Heard (cont)

- Roe fishery provides employment and supports coastal communities
- Roe herring provides jobs and stimulates the economy
- The current stock assessment results support and allow for commercial herring fisheries in the SOG and other areas.
- Decisions should be science based
- Limiting fishery access does not allow for economically viable fisheries. A need for multiple areas and subareas.

What We Heard (cont)

- Roe is not the “best use” of the fish – herring should be left in the water as forage fish for other species (chinook, whales, seabirds)
- The roe fishery is a “reduction” fishery
- The roe fishery does not provide as great an economic benefit as other industries (salmon fishing, tourism)
- Commercial fisheries have reduced populations of herring coastwide so the last remaining large stock should not be fished

Information Provided

- DFO conducts a comprehensive annual stock assessment program to determine herring stock status and sustainable harvest levels
- The maximum 20% harvest rate in SOG:
 - leaves 80% of mature fish and juveniles available to support future herring populations and ecosystem processes
 - has been tested by the Management Strategy Evaluation process to date
- The Strait of Georgia supports high densities of many marine mammals which are key components of a healthy and productive ecosystem.

Information Provided (cont)

- While the Roe fishery is exempted from the Fisheries Act, (which prohibits the harvest of fish for use in fish meal and fertilizer), the primary product is the roe which is extracted for human consumption. Herring carcasses may be rendered for other uses as with by-products of other commercial fisheries.
- DFO does not control or regulate markets or the economics of fisheries, and instead applies the best available Science to set quotas that will meet stock conservation objectives over time.
- Areas that have seen low spawn levels in recent years were closed to year to ensure that fisheries are not opened on small areas of spawn and prioritize FSC harvesting

Marine Conservation Targets and Initiatives

- Canada's target of ocean protection is 10% by 2020
 - Surpassed interim target of 5% by 2017 (now at 7.7%)
- More information: <http://www.pac.dfo-mpo.gc.ca/consultation/oceans/index-eng.html>
- Planning Initiatives:
 - Pacific North Coast Integrated Management Area (PNCIMA)
 - Offshore Pacific MPA
 - Hecate Strait & Queen Charlotte Sound Glass Sponge Reefs
 - MPA Network Planning in Northern/Southern Shelf Bioregions
 - Howe Sound Glass Sponge Reef Conservation Initiative
 - Rockfish Conservation Area Review
 - Scott Islands Marine National Wildlife Area
 - Gwaii Haanas National Marine Conservation Area
 - Southern Strait of Georgia National Marine Conservation Area

MPA Network Planning

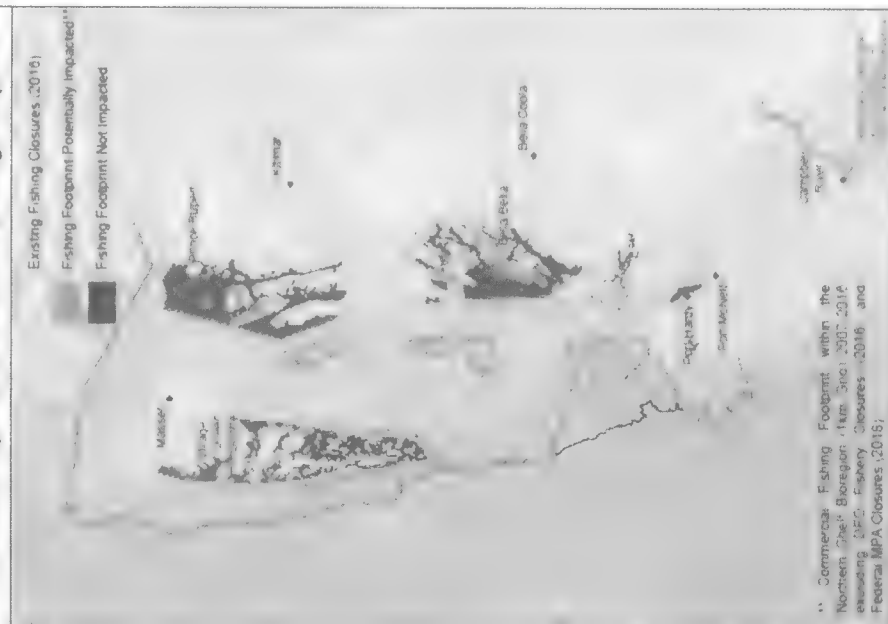
- Government of Canada, Province of BC, and 16 First Nations in a tripartite government agreement for Northern Shelf Bioregion network planning
- Working to develop a network of MPAs in the Northern Shelf Bioregion
- Designed to provide clarity and predictability to longer term marine protection and management within NSB
- Southern Shelf Bioregion planning in very preliminary stages



Northern Shelf Network Planning in the NSB

- Consultation Phase on Network Scenario and associated management measures runs from February-June 30, and then again in the fall
 - Final deadline for feedback: January 30, 2020
- Presented to MPA Network Oceans Advisory Committees (5) in February; OAC members currently engaging with their constituents on the draft design
 - Provision of feedback through OAC members
- Following this consultation, the Network Action Plan will be finalized (target date of March 2020)
- More information:
<http://mpanetwork.ca/bcnorthernshelf/>
- DFO contact: Aleria Ladwig (SFF)

Northern Shelf Bioregion Marine Protected Area Network - Draft Network and Commercial Fishing Activity



Existing Closures within DRAFT Network		Fishing Footprint Not Impacted by DRAFT Network		Fishing Footprint Potentially Impacted by DRAFT Network		Potential Economic Impact from DRAFT Network
(ha ²)	(% already closed)	Fishing Footprint Unaffected (ha ²)	(% of Total Footprint)	(ha ²)	(% of Total Footprint)	(% CANS within HCS)
10,895	50%	0,467	83%	1,037	15%	9039,360
						25.2%

002 30. 35 0

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Rockfish Conservation Area Review

A multi-year review of the conservation effectiveness of RCAs is currently underway.

Areas of focus:

1. Assess activities and risks in RCAs
2. Re-evaluate RCA boundaries and locations
3. Engagement

Currently herring gillnet/seine fishing is permitted in RCAs

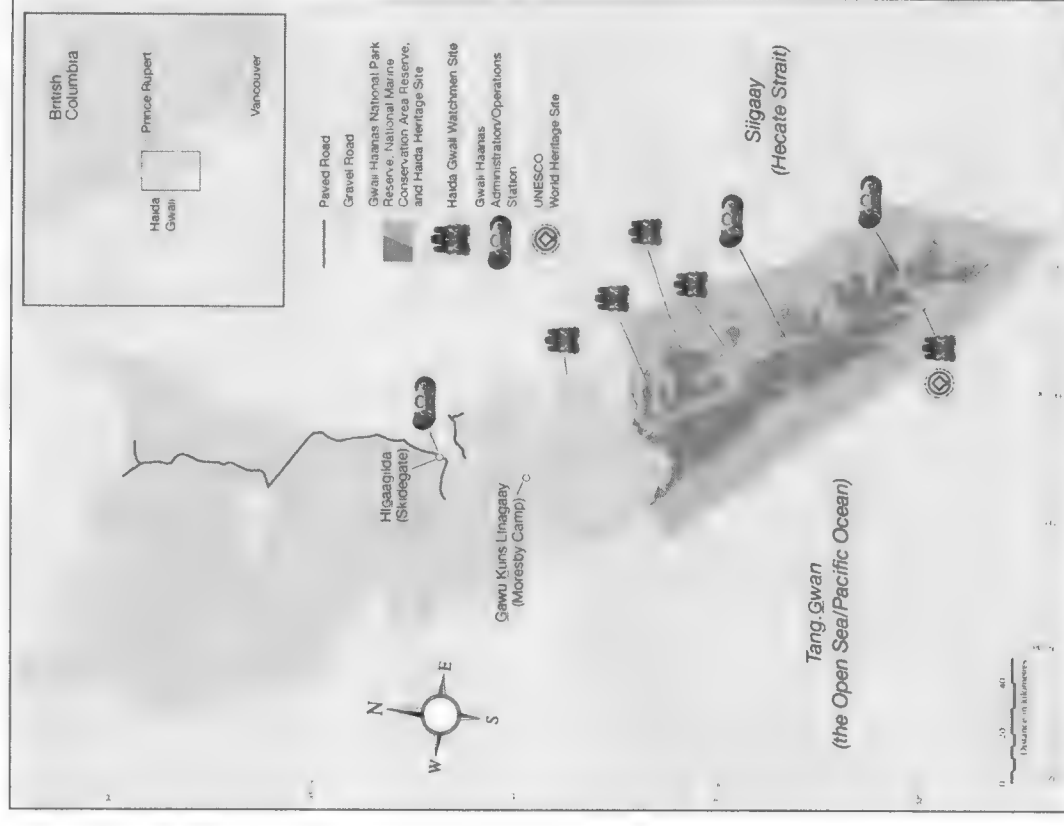


RCA Review: Engagement Timeline

- Review report underwent CSAs review; accepted with major revisions
 - Expected publication date in Spring, 2019
 - Herring seine and gillnet fisheries not identified as significant risk to rockfish
 - Likely RCAs will change in size, configuration, and location; possibly tiered protection
- Engagement aligning with NSB/SSB processes
 - Focus for 2019 is NSB
 - Meetings planned for summer in Prince Rupert and Campbell River, and online consultation

Gwaii Haanas National Marine Conservation Area Reserve (NMCAR)

- Cooperatively managed by the Archipelago Management Board (Council of Haida Nation and Government of Canada)
- Activities are guided by the Gwaii Haanas Land-Sea-People management plan, signed in November, 2018
 - Includes a Marine Zoning Framework
- DFO Contact: Jacinthe Amyot (Oceans)



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- 000495



Marine Mammal Reporting

- Reporting of marine mammal interactions are required in conditions of license
- Interactions include those that negatively impact the mammal, such as entanglement, collision, and death

- Form: <http://www.dfo-mpo.gc.ca/fm-gp/mammals-mammiferes/report-rapport-eng.html>

 Fisheries and Oceans Canada / Pêches et Océans Canada

SCHEDULE V
MARINE MAMMAL INTERACTION FORM
Protected B

Please fill out every section below. Once completed, this form must be submitted to DFO per instructions on page 2.

Interaction Information Interaction Date _____ Interaction Time _____ Location _____ Latitude _____ Deg _____ Min _____ Longitude _____ Deg _____ Min _____		Individual Observing the Interaction Name _____ Address _____ Phone _____ Email _____ Vessel Name _____ Target Species _____ Gear Type _____ Province/Territory _____		Identifier Logbook # _____ Other _____ Gear Damage <input type="checkbox"/> yes <input type="checkbox"/> no Gear Lost <input type="checkbox"/> yes <input type="checkbox"/> no Cause Known <input type="checkbox"/> yes <input type="checkbox"/> no Comments _____	
Species (check one) <input type="checkbox"/> Dolphin / Porpoise Species code _____ Undersized _____ <input type="checkbox"/> Whale Species code _____ Undersized _____ <input type="checkbox"/> Seal / Sled Lion Species code _____ Undersized _____		Incident Type <input type="checkbox"/> Dead Animal <input type="checkbox"/> Entanglement <input type="checkbox"/> Collision <input type="checkbox"/> Harassment <input type="checkbox"/> Live Stranding <input type="checkbox"/> Shooting <input type="checkbox"/> Sick or Injured <input type="checkbox"/> Depredation		Animal Condition Appears Healthy <input type="checkbox"/> Sick or Injured <input type="checkbox"/> Dead <input type="checkbox"/> Unknown <input type="checkbox"/>	
ID Confidence <input type="checkbox"/> Certain <input type="checkbox"/> Probable <input type="checkbox"/> Possible <input type="checkbox"/> Uncertain		Number of Animals Minimum # _____ Maximum # _____ Best Estimate _____		Support Material Photos <input type="checkbox"/> Video <input type="checkbox"/> Samples <input type="checkbox"/> Other <input type="checkbox"/>	
Body Length <1m (<3 ft) _____ 1-1.5m (3.5 ft) _____ 1.5-2m (5-7 ft) _____ 2-3m (7-10 ft) _____ 3-6m (10-25 ft) _____ 6-15m (25-50 ft) _____ 16-25m (50-80 ft) _____ >26m (>80 ft) _____		Comments: (time/line, actions, people involved, etc.) _____ _____ _____			

US Marine Mammal Protection Act (MMPA)

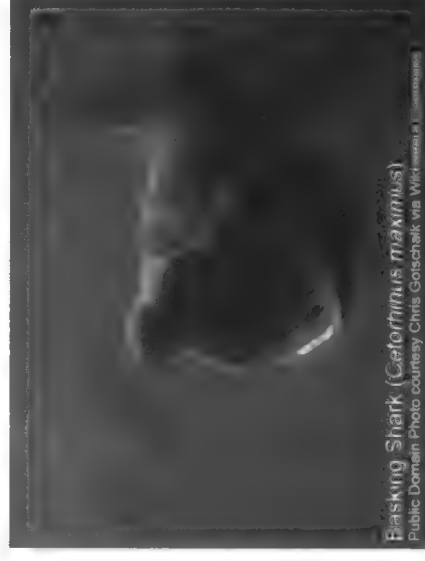
- US MMPA requires export fisheries to meet US legislative standards related to marine mammal bycatch, in order to access the US market
- By March 2021 export fisheries need to show they have measures in place to implement the requirements of the Act
- NOAA requests a progress report on the above actions that includes:
 - marine mammals interacting with that fishery and incidents of mortality/serious injury
 - regulatory programs in place for the fishery (fishery management measures e.g. Conditions of Licence)
 - regulatory programs under development
 - other: meetings, engagement, research, gear, etc

US MMPA

- To contribute to this process, summaries (template provided) have been developed by DFO on each export fishery
- Draft summaries will be provided, seeking industry review on these summaries by May 23 as they will be rolled up for approval last week in May.
- Progress report due to NOAA on July 1
- Following this submission, a gear innovation summit is planned for Fall, 2019
- License conditions included in 2019/20 for seine gear not to intentionally encircle mammals
 - DFO Contact: Lee Harber, FM

Shark Reporting

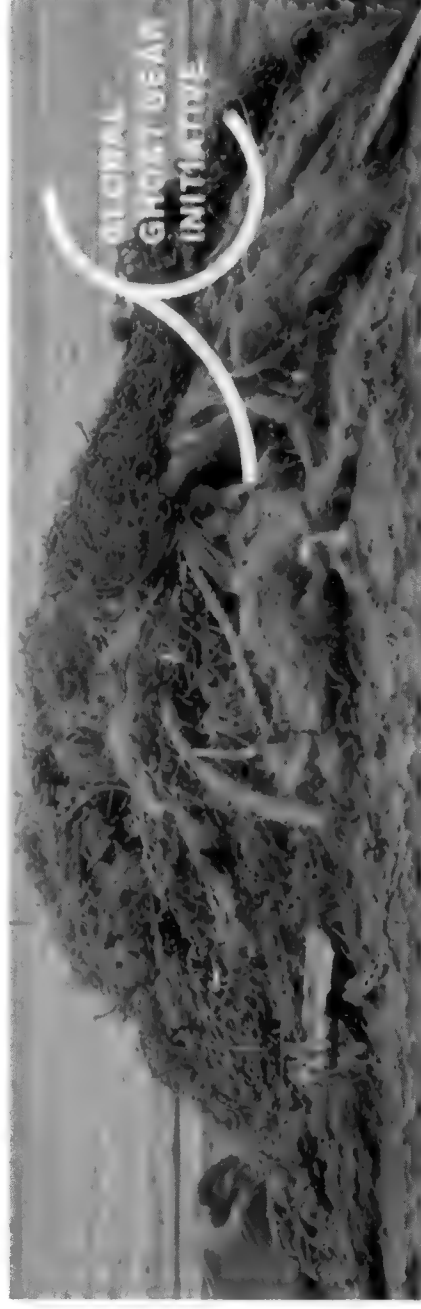
- Shark bycatch clause is in IFMP and included in license conditions since 2018/19
- Code of conduct for shark/basking shark encounters
- More information: <http://www.dfo-mpo.gc.ca/species-especes/publications/sharks/npoa-sharks-pan-requins/index-eng.html>
- Lead: Heather Brekke, SARA marine team



Basking Shark (*Cetorhinus maximus*)
Public Domain Photo courtesy Chris Gotschalk via Wikimedia Commons

Global Ghost Gear Initiative (GGGI)

- Global, cross-sectoral initiative to reduce amount of lost, abandoned or otherwise discard fishing gear (aka “ghost gear”)
- License conditions are being incorporated for all Canadian fisheries in 2019 – herring fisheries will see them in the 2019/20 license conditions
- License conditions include requirements to report lost fishing gear and retrieval of lost gear



Fisheries Act Amendments

- Amendments to the *Fisheries Act* (Bill C-68) passed a second reading in the Senate on December 11, 2018 and were referred to the committee
- The amendments contained in Bill C68 include new Fish Stock provisions and requirements to:
 - maintain major fish stocks at sustainable levels (section 6.1);
 - develop rebuilding plans for major stocks that have declined to their critical zone (section 6.2); and
 - prescribe the list of major stocks to which sections 6.1 and 6.2 apply in regulation (section 6.3).
- There is a new authority to develop regulations respecting rebuilding of fish stocks (subsection 43(1)).

Standing Committee on Fisheries and Oceans: Regulation of West Coast Fisheries

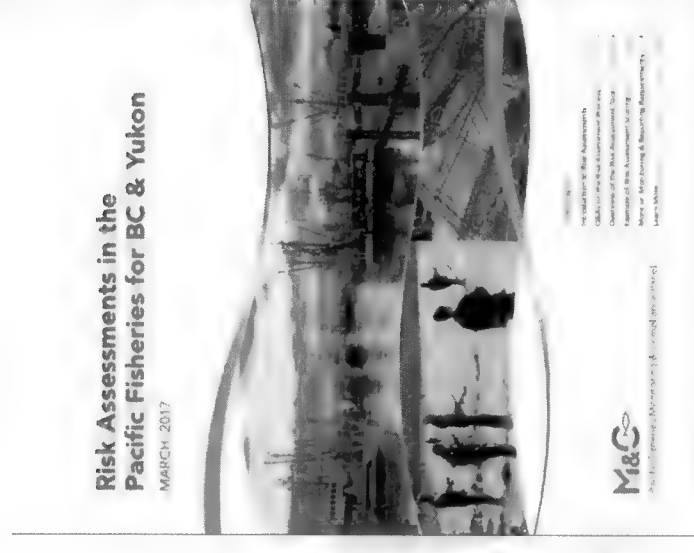
- In June, 2018, the Standing Committee on Fisheries and Oceans (SCOFO) indicated it would undertake a study to examine:
 - *“fishing licences, quotas, and owner operator and fleet separation policies, in order to evaluate the impact of the current regime on fisheries management outcomes, the distribution of economic benefits generated by the industry and the aspirations of fishers and their communities, and to provide the government with options and recommendations to improve those outcomes”*

Standing Committee on Fisheries and Oceans: Regulation of West Coast Fisheries

- The review started on January 30, 2019
- DFO, industry, and First Nations spoke before the committee
- The committee developed a draft report: “West Coast Fisheries: Sharing Risks and Benefits”; the report was adopted on April 11, 2019
- Report will be presented to the House of Commons and then a press conference and news releases are planned
- SCOF requested that DFO submit a comprehensive response by June 15, 2019

Fishery Monitoring Risk Assessments

- Strategic Framework for Fishery Monitoring and Catch Reporting in the Pacific Fisheries (2012) requires that all fisheries in BC and Yukon undergo risk assessments
- Committed to 2018/19 for 'Round 1' Fisheries, including commercial herring fisheries
- Comments/changes from commercial harvesters incorporated, included in draft IFMP for broader consultation
- 'Final' Roe, SOK, and Food and Bait versions in 2018/19 IFMP
- Next steps: finalization of Special Use RA and development of specific monitoring objectives with commercial harvesters



National Fishery Monitoring Policy

- Scope: Applies to all commercial, recreational and Indigenous wild capture fishing activities in Canadian fisheries waters. It also applies to fisheries licensed and/or managed by DFO that operate outside of Canada's exclusive economic zone.
- DFO has completed the consultations on the draft Policy statement and Implementation Guidance
- NHQ is reviewing the feedback received and will reflect that feedback in the Policy documents
- Aim is to finalize the Policy within the next couple of months
- Continue work with regional risk assessments until national policy and associated tools in place
- DFO Contacts: Marc Clemens (NHQ) and Caroline Wells(SFF, FM – Pacific)

Vibrio cholerae



- Pacific Fishery Management Areas 14-1, 14-4, and 14-5 were closed to fishing for herring eggs by handpicking March 23, 2018, due to concern for human health
- Closure was revoked on February 27, 2019 based on advice from Vancouver Island Health Authority following an investigation of the illnesses and area closure; it was determined the ongoing risk is low
- More information on safe handling procedures and characteristics of the *V. cholerae* bacteria: <https://www.islandhealth.ca/learn-about-health/seasonal-health/herring-egg-harvest-re-opens-health-advice-reduce-risk-illness>

Norovirus

- Two separate Norovirus outbreaks in 2017 and 2018 linked to consumption of oysters harvested from Baynes Sound
- The BCCDC undertook a risk assessment on the issue and the confirmed cause of these outbreaks was human sewage
- Commercial fishing vessels were identified as a potential source of contamination
- Roe herring fishery in SOG in close proximity to shellfish harvest areas.
- Full risk assessment available here: <http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Guidelines%20and%20Manuals/Health-Environment/2018%20norovirus%20outbreak%20linked%20to%20vessels%20and%20oysters.pdf>

Norovirus Action Plan 2018-2019

- Pre-season action planning meetings between government partners and industry stakeholders:
 - 1) Minimize risk of contaminating shellfish and resulting illnesses.
 - 2) Prevent precautionary sanitary closures to shellfish harvest.
- In-season mitigation measures:
 - Improved fleet education and awareness about sewage discharge risks and regulations.
 - Minimized commercial herring vessel congregations in important shellfish harvest areas.
 - In-season communication between industry and regulatory partners.
- Post-Season Review:
 - No sanitary closures implemented and no shellfish related illnesses reported.
 - Ongoing collaboration with government partners and industry stakeholders, meeting May 10.



Fisheries and Oceans
Canada

Pêches et Océans
Canada

IHHPC Post-Season Meeting

Meeting Record

Date May 22, 2019; 9AM-4PM

Location Seminar Rooms A&B, Pacific Biological Station, Nanaimo

Purpose of Meeting Post-season review of 2018/19 herring fisheries

Group/Advisory Committee Integrated Herring Harvest Planning Committee (IHHPC)

Chair: Brenda Spence, DFO FM

Participants:

Jim Lane, Nuuchah-Nulth Tribal Council (NTC)
Russ Jones, Council of Haida Nation (CHN)
Penny White, Metlakatla First Nation
Chuck Ashcroft, Sport Fishing Advisory Board (SFAB)
Dan McNeil, Haida Nation
Jaasaljuus, Haida Nation
Kim Lagimodiere, Cowichan Tribes (morning only)
Jim McIsaac, United Fishermens Allied Workers Union (UFAWU) (afternoon only)
Tony Roberts Jr., A-Tlegay Fisheries Society
Ted Assu, A-Tlegay Fisheries Society
Lyle Pierce, Harvester/Herring Industry Advisory Board (HIAB)
Chris Wick, Processor/HIAB
Rob Morley, Herring Conservation Research Society (HCRS)/ HIAB
Colin McMillan, Canadian Fishing Company (CFC)/ HIAB
Brad Mirau, Aero Trading/HIAB
Greg Thomas, HCRS/HIAB
John Nishidate, HIAB
Bob Rezansoff, HIAB
Darrell McEachern, HIAB
Scott Wallace, David Suzuki Foundation
Nicole Frederickson, Island Marine Aquatic Working Group (IMAWG)
Sabrina Crowley, NTC Uu-a-thluk Fisheries
Darah Gibson, BC Ministry of Agriculture
Kevin Romanin, BC Ministry of Agriculture
Roger Paquette, Hub City Fisheries
Archie Little, Nuchatlaht
Rufus Charleson, Hesquiaht

DFO Participants:

Victoria
Postlethwaite, RHQ
FM (minutes recorder)
Jaclyn Cleary, Science
Mark Fetterly, RHQ
FM* (morning only)
Amber Neuman, FM SC
Jen Gordon, FM NC (morning only)
Bryan Rusch, FM SC
Corey Martens, FM NC
Brad Koroluk, FM NC*
Wen-Bey Liu, NHQ
FM* (morning only)
Mike Spence, FM SC

Attendees:



Materials distributed

- Agenda
- Initiatives and Projects Presentation
- Post-Season Review Presentation

Meeting Objectives

- Review previous action items
- Review and update to IHHPC Terms of Reference
- Review of 2018/2019 Pacific Herring fisheries
- Discuss key initiatives and process to inform planning for 2019/2020 and beyond
- Provide an update on Pacific Herring Renewal and MSE and planned work

The following notes supplement the deck "IHHPC Post-Season 2019 May 1 final"

IHHPC Action Items (slides 4-10)

SOK Transferability (slide 8)

- Willingness from IHHPC to work with the Department to progress this issue; DFO has made very little progress.
- Next step is to develop consultation materials in collaboration with the IHHPC
- Members of the working group: Lyle Pierce, Larry Greba
 - o This group can scope the issue in a briefing document and then we can address the SCOFO report should it have any implications

IHHPC Terms of Reference (slide 9 and 10)

- There was a large discussion on how the proposed "community seat" would work:
 - o How would we determine who represents "the public"?
 - o Representing a constituency would be difficult if they had to funnel all concerns from such a large area (all of the Strait of Georgia (SOG))
 - o DFO noted that not having a way in to the process is hard for these NGOs
 - o A-TTed: The group is not representative of the national interest
 - o There is a large amount of information that can be forwarded to members of the public
 - o SFAB and others may be able to provide this way in
- Tony: UNDRIP – nothing gets incorporated into the IFMP
 - o Funding for this process?
 - o Want to ensure that the Department is getting FPIC
 - o Want a Tier 1, 2, 3 process
- Archie Little: need to start managing resources, have a tunnel vision where industry is only focused on seine and gillnets.
 - o How do we best get information out so that we don't have petitions
 - o How do we best manage herring so that everybody benefits
 - o This additional person can be used to share information to people that don't understand herring management



- Scott Wallace: much broader interest in this fishery than is at this table, there needs to be a forum where people can get information
 - o **Scott represents the MCC, so it could be a broader seat to represent other conservation groups**
 - o The environmental sector has a broad interest as well as other groups
 - o The need is definitely there
- Rob: If we think that by expanding the committee we will be providing enough information and education of what is taken out vs what is left in the water in the way we are managing
 - o One person cannot fill this role
 - o The DFO advisory process is set up to deal with people that have a direct interest in the program
 - o DFO can communicate through public and education meetings as well as through the internet
 - o This is not a forum to seek input and educate the broad public; it is to develop management plans
 - o Brenda: we have a planning process where we have useful discussions and they are valuable to other people. This committee is not closed, and does not take away from the Department having bilateral meetings
- Jim Lane: this is a Tier 3 advisory process and is one of the better terms of reference that he's seen. The public seat will be a challenge
 - o Comments are valid but they are not specific to what the TOR are supposed to be
 - o This has expanded to show that one rep cannot speak to an entire area
- Tony: can we consider Tier 2 processes where the Department comes to meet with nations prior to the Tier 3 process?
 - o We can check with our consultation secretariat about the tiered process
 - o Fraser River Panel for Salmon and Aquaculture process are ones to consider, we can look at these to consider
 - o Need to adhere to UNDRIP and incorporated into what we are doing here; **frame the TOR appropriately – action item, follow up with CS about consistency**
 - o **DFO to make changes and redistribute. IHHP to provide comments and suggestions**

Summary of MSE Process and Key Steps

- Rob: Discussion of simulation evaluations with advisory groups prior to presenting the Science Response in July?
 - o Yes, have a timeline of dates
- Tony: How will TEK be incorporated into this process?
 - o Jaclyn: This comes in to the process with discussion of objectives. With WCVI and SOG in the first cycle and to a greater extent with NCN, we met to discuss objectives for herring and simulation tested them for the first cycle. Objectives can either be simulation tested or may be relevant in general for FSC access in traditional territories. We documented



- these objectives and identified the ones that could be simulation tested in the first round, and then further discussions will be had about the other objectives
- Tony: talking about general management of the fishery within their territory
 - Jaclyn: the NCN developed many objectives including how they would like to see fisheries managed within their territory and this was documented in the objectives tables. We want to capture that type of information in all stock areas
- Russ: The Haida nation's intention is that we are involved every step of the way, we are working through this process with them at every step and this includes looking at how traditional knowledge informs the objectives as well as the understanding of herring in their area
 - Amber: we have opened up the opportunity for First Nations groups to provide information. Groups have come to us directly and wanting to work through the process, mainly in aggregates (A-Tlegay, QARS). Engaging departmentally with those that have technical expertise and then they are going back to their leadership and developing objectives, and we are working through these.
 - Brenda: we are different stages with different nations, the NCN are much farther ahead. We are looking to capture other measureable objectives. We don't have the capacity to do a spatial operating model right now but we are looking at that for the future. We think it's going well engaging with nations that have the capacity.
 - Archie: want to keep mentioning that we want to see a process where we manage resources and then provide access. We have to empower Science and get rid of politics and lobbyists. There needs to be conservation for future generations.
 - Brenda: The MSE process allows us to record those issues to be able to address those issues. We want to work together
 - Archie: Can't throw away Science work by politics
 - Jaclyn: One of the purposes is for us to be able to integrate traditional knowledge which include the discussion of management procedures
-
- Fleet dynamics will help us to simulate the timing of the fisheries rather than in an aggregate fleet
 - MPs that are spatial don't necessarily need a spatial management model and vice versa, and we are in the process of trying to flush out what this will look like
 - Objectives for SOK are highly spatial; we are trying to make incremental changes to the operating model to make semi-spatial decisions
 - Looking at December or January for a CSAS meeting; a lot of this is stemming from a rebuilding plan development with Haida Gwaii herring. The stock is in the critical zone, which immediately triggers this requirements. DFO and CHN are working on co-developing a rebuilding plan. The MSE process is one element of this process.
 - This process has brought forward many concerns such as different fishery type conflicts
 - Rob: interested to see how to incorporate spatial dynamics
 - Jaclyn: currently our model does not allow this. It will developed through use of historical data and local traditional knowledge. In Haida, there are 3 core spawning areas, and we are looking to see how we can fit the data to that hypothesis. If we simulate the data in that way and the aggregate follows the aggregate stock biomass, it's reasonable.



- Rob: very complicated, not sure if we will have something useful by December. HIAB's objectives are coastwide.
 - Jaclyn: We don't feel that the data support a coastwide operating model, but that doesn't mean we can't have coastwide objectives. We have ID'd actions about ways we can address HIAB's concerns and objectives, and would like to have a meeting to discuss this
 - Rob: where does industry get into this process?
 - Jaclyn: We have a working group with DFO, PCA, and CHN. One way to incorporate objectives for industry is to bring them into the December CSAS process
 - Rob: we have interest in fishing in Haida Gwaii and we would like to have input into this rebuilding plan, beyond articulating objectives
 - Russ: we are at a very early stage with the rebuilding plan, **just developing the workplan right now and we need to have some internal discussions about how best to do that engagement – the working group will bring this up at the July meeting and report back to industry**
- **DFO and IHHP members to finalize meeting dates**
- Bob: This would appear to be a mortality issue in Haida Gwaii since we haven't fished there for a long time. How would the rebuilding plan deal with the predator issue in that area? There is not much you can do about that
 - Jaclyn: in terms of scenarios, we are looking at things like if natural mortality changes, what types of management procedures will support continued rebuilding of the stocks (e.g. if there is a change to mortality due to less whales, what MPs would support continued rebuilding). The requirements of the plan are to provide management advice so that management supports continued rebuilding of stocks, not thwarting it.
- Ted: How do you assess your current stock assessment? Has there been less assessment in Haida Gwaii?
 - Jaclyn: we've had the same stock assessment surveys in HG that we do in all stock areas. There has not been a change in number of survey days or effort (includes test fishery, spawn recon, biological sampling, and all work together to determine where herring is, as well as a dedicated dive survey program). We are satisfied with the quality of data coming from there, it is high quality and we have a lot of in-season discussions about if spawn was missed and we incorporate that into the assessment as uncertainty or flag concerns to fisheries management. We are struggling to determine why the stocks have been so low.
 - Brenda: the assessment program is not concrete funding each year, but we allocate about 1.4\$ million each year.
- Tony: we are managing for the resource, not to have people come in to lobby for a fishery. We don't want to see a fishery occurring as soon as the stocks are above cutoff. Let's manage the resource first, and then if there is a portion that HIAB can manage, we will. First Nations have capacity to do the stock assessment. We have areas that are not discussed. Conservation means something different to DFO than it does to First Nations.



- Russ: predators are a factor for sure in herring status but it is also ocean conditions (water temperature). On the surveys, we got better coverage in 2W than last year; we might need increased timing for the survey charters.

2019 Plan

- Once we have the data summaries out for this past year, we want to have meetings about some early thinking for each of the areas
- The Science Response and webex will be provided in late September or early October
- The next IHHPC will be in early October following the Science advice

Meeting schedule

- Nicole to follow up with DFO about date of IMAWG strategic planning and annual governance meeting
- Archie: want to be careful with traditional knowledge, it should be present and used to the max. We are quickly blaming the mortality from animals, super trawlers are out there and there is no monitoring, are they accessing herring? Herring is bottom of the food chain and will impact other fisheries. We all need to be part of the process for rebuilding herring. Herring meeting in Richmond; no one spoke about solutions.
 - o **Hake trawlers – DFO can follow up with groundfish team and pull bycatch numbers and report back to IHHPC**
 - o Trawlers are often escape mortality, so bycatch won't be a lot but could be high, FAO has some information on that
- Scott: June 11 meeting: MSE frame with Conservancy group, David Suzuki foundation could be involved
 - o Brenda: we have provided information to them about intro to MSE and objectives. Don't have an agenda yet for the meeting. We definitely will be discussing MSE. We are just not at the place where we are engaging with all groups on MSE right now, but looking at other groups objectives that can be incorporated.
- Archie: NTC is meeting with DFO all year, this has increased a lot
 - o Brenda: this is helping us as well, we want continuous engagement and early advice and decisions. Our goal is provide information as early as we can so we can move decision points back.

Communications

What further steps or approaches does IHHPC recommend for the Department to do?

- Chuck: know Science is going to look at MSE simulation runs with respect to chinook needs and relationship to herring, this will be an important step and this will satisfy a lot of SFAB
 - o DFO to continue to work with SFAB to develop an objective to run in the MSE simulations in 2020
 - o Jaclyn: this ties in to what we discussed in relation to available prey needs and incorporate into review process this year



- Rob: what role does herring play in the ecosystem? How are they related to chinook stocks? Need to look over the entire life cycle of herring, herring also eat juvenile chinook. There has been a much further link to SRKW, the whole area needs attention in terms of addressing the issues but is not simple. If you do a correlation between herring and chinook populations, you'll find that herring populations have been increasing while chinook populations have been declining.
 - Bob: Information on chinook populations in Alaska, the chinook there were declining a lot and unknown reasons why this was happening. Here chinook are in trouble but why they are is open to speculation. Every group is being asked to take cutbacks on their access to chinook – people are raising alarm bells with respect to the relationship to herring as a tool to avoid being part of the cutbacks on the chinook take, including pointing fingers to another fishery. Chinook migration patterns and behavior don't support herring as the major cause of chinook declines.
 - Chuck: In the simulation run we had to provide a very specific objective which science looks like it's going to run, but initially they will look at this for 2020 and we will see the results.
- Nicole: student at UVic is doing a study on relationship between herring and chinook in SOG and results show that there is a relationship between the size of herring and size of chinook. Hypothesis is that we have lost the smaller size herring which juvenile chinook feed on; research may show that the juvenile herring have gotten too big so the chinook in the SOG may not be able to eat that herring. Very preliminary right now.
 - **Nicole to distribute the presentation that the researcher presented to IMAWG, as well as Will Dogoods contact information – done, we can distribute to the larger IHPC**
- Scott: The chinook herring relationship is not linear. How we manage in this context and with MSE – this fishery can improve – it's sustainable but not perfect. When the fishery starts every spring, it's forecast at 20%, and the in-season management – would like to see the fishery start at a lower harvest rate and then in-season management of ratcheting up the harvest rate as appropriate. Also don't know the ecosystem role of herring and spatial distribution – more information on this would be very helpful.
- Kim's question disappeared – DFO will reach out to her and incorporate into notes
- Rob: pleased with public interviews in terms of responding to requests, would like to see a better representation on the website on explanation of herring fishery and simplified way to get stock status information. Going to CSAS website and downloading stock assessment and SRs is complicated for most people and it's not simple and clear. Summary graph that the Minister used in his op-ed was good and could be presented. Since a lot of it is going through social media, could be passed through those accounts
 - Brenda: we were not prepared this year for the level of interest, would be transferable to the webpage – DFO to look into this, including economics of the fishery distribute to HIAB for their review
 - **DFO to work on better communication on herring on the website and through social media**
 - Jim: this is around the fishery in general. In terms of MSE, this is looking at a variety of stakeholders input, use this as a basis for communication. Complex ecosystem as MCC rep said is completely relevant, want DFO to share what the objectives are, how the



decisions are made and how advice is incorporated. Telling the public this is important, want them to know that these decisions are made with science based decisions. Show what has been done already on MSE to show that there's not a void of information in terms of how decisions are made.

- **DFO to work on more education regarding MSE process for the public**
- DFO did provide information on MSE in the letter responses back to people

Area Summaries

WCVI

- Satellite imagery project may be applied for future years and in other areas
- Sample coverage on the west coast has had good coverage the last few years
- Compared to last year the test vessel sounded a bit less than last year and 45 compared to 38nm this year. Spawn did not seem as significant this year with less layers.
- Archie: were the eggs smaller?
 - o Mike: not sure yet, but that would come from the dive survey program
- Jim Lane: spawning was quite a bit later, spawn into April, very start-stop activity
 - o Mike: spawn was 1-2 weeks later than usual
 - o Jim: definitely different than last year
 - o Mike: test vessel had a set of juvenile sardines

Strait of Georgia

- South of Nanaimo, another season of very little/no spawn observed
- Significant measures implemented this year to mitigate potential shellfish harvest closures; no closures had to be put into place and no illnesses reported this year
- Drone use: observed before but not at the close distances that were reported this year
 - o This was interested members of the public that were trying to video the herring fishery
 - o First time we've seen them in the gulf; they were well inside the distances that they are allowed to be around people
 - o A lot of vessels in proximity to the fishing gear as well which was problematic
- Use of seal deterrents (e.g. seal bombs) – clarification this year that it was not allowed
- Jim McIsaac: water quality issues? Kelp quality? Seal lion interactions?
 - o Bryan: very little kelp in SOG. Late spawn around Chrome had similar egg mortality issues due to low oxygen (not as bad as Area 27).
 - o Amber: test vessels did note warmer water temperatures compared to previous years
 - o Brenda: 100% ASO coverage, sea lion mortalities resulted from this – 4 total fatalities from being wrapped around the net
- Lyle: spawn activity quite late – what is the cutoff date for reporting spawn?
 - o Bryan: any reports we get we incorporate. Stopped flying in late March but there was still spawn. Keep track of what we hear about.
- Tony: issue with soundings/behavior of herring? Herring were tight together and near the bottom, is that difficult to sound the stocks due to that?
 - o Bryan: seem to be behaving differently, hard to assess, likely due to high presence of sea lions, definitely impacted the assessment program
 - o Tony: want to make sure we are being cautious about the assessment



- Archie: last year we heard that the SOG fishery closed because of small fish
 - o Brenda: more younger fish last year so less economically viable so chose not to take the full quota. This year there was a larger proportion of large fish.

Central Coast (6/7/8 and 10)

- Spawn and SOK fishery was earlier than last year, caught a lot of people off guard especially in Kitasu Bay and Spiller
- GNN did the assessment in Area 10 and provided the map. This data goes to Science and it gets incorporated into the database
- Potential to use satellite imagery in this area but needs further internal discussions
- **The Kitasoo tried to get out to Clifford Bay to do a dive survey but don't have the information yet; Brad to follow up with Ernie to find out more about that**
- Scott: satellite imagery project?
 - o Brenda: was funded by science and led by a WCVI resource manager. Looked at both days that had and did not have spawn. Are good for areas with poor weather or when flights are really expensive

PRD

Big Bay

- Corey provided overview of observed spawn, 37 nm of spawn, more fluid than previous years
 - o Fish appeared smaller than usual, intensity seemed less than 2018. Total stocks appeared stronger than 2018.
- Drone Project: lot of shallow spots in Big Bay so utilized a drone to find where the stocks were and see the spawn that way. Was convenient for use in this area and was able to fly in all weather. Can use this to compare spawning from year to year and ensure no areas were missed.
 - o Works well for this specific assessment area. Not a big cost to it to start other than initial cost of the camera and staff training
 - o Advantages: ability to hover over area is interesting and can operate in lots of bad weather
 - o 20 minute flight time, anchor the boat during use and can go a kilometer away. Would use a polarized lens next time. Could have used VR glasses to see things real time and make it more efficient.
 - o Supplemented with flights to cover the costs; could be used to fish more efficiently. Can fly same transects year to year to compare
 - o Trying to think of ways to manage the fisheries differently
- No effort for SOK fisheries in Big Bay
- **DFO to share Drone footage with IHHPC**

Kitkatla

- Spawn more significant than we have typically seen in this area



HG

- Peter Katinic back in the HG resource manager role (was Pat Fairweather in the season)
- Dan McNeil: done the dive survey last 2 years, this year substantially better than previous year, well over double the length of shoreline spawn, layers were thicker than other years. Carmichael spawn was unique – no activity in this area for well over a decade. Other areas (e.g. Island Bay) that also had spawn. Very encouraging year. Lack of kelp (macrocystic), unknown reason for that. Usual eelgrass and rock as spawning substrates. Kelp appeared stunted or in poor condition. In areas where we used to see an abundance of kelp we were not seeing very much.
 - o Jaclyn: sudden change?
 - o Dan: no this was noted last year, covered way more area this year. Also Dan was out around Cumshawa Inlet last week and noticed eye drift along shoreline with a lot of grey whales, likely saw some spawn there (north end of Louise Island around Church/Murthers Creek, old village site).
 - **Jaclyn will pass that along to the Science survey team**
- Archie: areas are being hit by whales, how can we plan next years fishery if we are losing herring once the assessments are done?
 - o Brenda: this shows up in the natural mortality piece of the forecast. Science team simulates results under different mortality scenarios (to take into account weather, predation, etc).
 - o Lyle Pearce – How many urchins have been removed from HG?
 - Dan M - Urchins are being removed from Murchison island - .5 million urchins moved from shoreline. Doing this to allow for vegetation (kelp) recovery. Year 3 of 5 year project
 - Jim - what is causing problems with kelp?
 - Dan – No projects specifically but general observations of greatly reduced kelp presence, looking at options of mapping vegetation. Urchins are part of the problem but there are likely other factors. Limited SOK harvest due to lack of kelp for herring to spawn on.

Miss anything else for the areas?

Break – 15 min back at 2:45

CHI/ADIMS Presentation

- Food and Bait conversions
- Best Use policy/reduction issues
- Herring Defenders migratory research (Washington)
- Next steps: move to low volume, high value fishery; training for young workers; license buyback; more research; going to keep communicating with media and politicians

- Rob: from an industry perspective, the information is misleading or factually incorrect. On the Science information, it does not match with the peer-reviewed science around this fishery. A lot



of attention on social media using misleading information, appealing to what people want to hear

- Are you open to true dialogue and discussion about the Science? This plays to people's fears about the environment. Management of the ecosystem is difficult and we do have evidence that this fishery is being sustainably managed. Many salmon that are not doing well are not dependent on herring
 - Grant: open to discussion and want to meet with them, want to find out more and where the errors are. Meeting with DFO.
- Archie: managing the resource first and foremost, manage properly there is enough for everybody. Need to look at all information. Will sign the petition because he wants to see change, some truth in the presentation. The SOG is the last place we have a fishery, we have not asked why other areas are not doing well. Fish farms have managed to feed the world and we are fighting over the last salmon and now herring. Look at the information and learn, we should have an open mind and use it as a tool to come forward with the best solution rather than protection over specific interests, so we can fix our problems and make the best decisions for the overall management of herring.
 - Brenda: everyone has their own interest but want to work together
 - Archie: want to ca
 - Brenda: come together and talk about our shared objective of conservation first
- Ted Assu: quality of work is poor. Haven't heard about discussions with A-Tlegay. They are heavily involved in the commercial fishing industry and wording around moratorium takes them out of the fishing all together. Insulting to DFO
- Bob: funding for HCRS, looks at DNA. Found 2 stocks that are more genetically distinct, most others were most genetically similar to each other. The 165 different spawning stocks is not believable. Making assumptions about how fishing affects stocks.
- Jim: what are the objectives? Development of conservation and EBM is evolving, if willing to work with industry on common understanding of sustainability, then we're in with the dialogue
- Chris: leave the fish in the water not worth taking out – how do you tell fishers that the money is not worth someones time?
 - Grant: look at value overall and want to know if it's the best value of the resource
 - Rob: if you want to talk about sustainability dialogue, take your petition down and then have a chat and reach agreement. Right now saying you will put them out of work.
 - Grant: if we can understand and be convinced of the science
- Jim Lane: be up front about concerns (e.g. around distribution of spawn and how could this be corrected). Look at your presentation and show where you are really concerned and what does this actually mean, might get a bit more traction on what you're saying.
- Brenda: have shared MSE process with these groups and framing discussions this way

Herring Harvest Options for 2014/2015 (in short tons)

Target HR	Area	2014 Spawning Biomass	Forecast 2015 Biomass Assuming Zero Catch	0.25 SBo	TAC at 50% P(removal rate > target HR)	FSC	SOK	SU	F&B	Un-allocated Potential Harvest	Prelim Roe SN Advice	Prelim Roe GN Advice	Difference
20%	PRD	31,992	28,407	17,030	5,897	600	1,000	130	500	3,667	800	1,200	1,667
20%	SOG	205,331	192,188	39,065	40,565	35		802	8,500	31,228	16,025	13,975	1,228
10%	2W			N/A	375					375			375
10%	27			N/A	170		105			65			65
10%	HG	25,345	19,053	9,360	1,984	150	1,000			834	1,000		-166
10%	*CC	27,981	30,573	16,599	3,153	600	1,125			1,428	800	700	-72
10%	WCVI	35,316	34,728	15,913	3,583	150	400			3,033	2,000	1,000	33

Estimates are for median values only

All values are in short tons

*Includes 525 tons for Heiltsuk commercial SOK

Negotiations on Ahousaht Plaintiffs Aboriginal rights to access herring will be mitigated

SN Avg. = 81.8 short tons

GN Avg. = 13.3 short tons

Herring Allocation in the St. of Georgia

From October 22/15 HIAB Subcommittee Meeting

Option 2: Setaside 2000 Tons (the long term average annual Food&Bait catch) for SN from the Total Quota, then share the remainder 55:45 (SN:GN)

Example Quota Calculation @ a Total Quota of 25,000 Tons, a F&B harvest of 9000 Ton, and a F&B setaside for SN of 2000 Tons (equal to the long term average F&B: catch)

1. Total Quota is 25000 Tons
2. Quota for Sharing is the Total Quota minus SN Setaside (25000 - 2000 = 23000 Tons)
3. SN share is 55% of the Quota for Sharing (.55 x 23000 = 12650 Tons)
4. GN share is 45% of the Quota for Sharing (.45 x 23000 = 10350 Tons)
5. SN Roe Quota is the SN Share minus Additional F&B (12650 - 7000 = 5650 Tons)

What this looks like in a Table:

	F&B Setaside for SN	Quota for Sharing (Ttl Quota - Setaside)	SN Share (55% of Quota for sharing)	GN Share (45% of Quota for Sharing)	Total Quota by Fishery
Roe			5650	10350	16000
Food & Bait	2000		7000		9000
Total		23000	12650	10350	25000
Roe Fishery Shares:			35%	65%	
Overall Shares:			59%	41%	

What does this mean:

1. The bulk of the Quota is shared 55:45 (SN:GN) consistent with policy for roe sharing.
2. The historic participation of SN in the F&B fishery is recognized by setting aside the long term average annual F&B catch from the Quota for Sharing.
3. The greater the F&B Quota, the lower the SN Roe Quota, which limits competition with GNs.
4. There are tradeoffs. Under the old allocation scheme, the SN share of a 16000 Ton Roe Quota would be 8800 Tons (.55 x 16000 Tons).
Therefore in this example SNs forego 3150 Tons of Roe (8800 - 5650 Tons) to access 7000 Tons Additional F&B.

Some Questions:

1. The Total Quota needs to fit within the TAC set by DFO, which is currently uncertain.
2. Does there need to be an upper limit on F&B quota?
3. How will this option fit with Quota Shares in Management Areas other than the St. of Georgia?
4. Need to provide for Sn licences opting for F&B from the Roe fishery.

The Table below describes SN and GN Quotas when Option 2 is applied across a range of Total Quotas with varying levels of F&B Quota

Total Quota	F&B Setaside for	Quota for Sharing	Additional F&B for SN	Total F&B for SN	Roe SN	Roe GN	Total Roe	Total SN (F&B + Roe)	SN share of Roe Quota	GN Share of Roe Quota	SN Share of Total Quota	GN Share of Total Quota	Tradeoff	
													Roe SN (55% of Total Roe)	Dif
10000	2000	8000	0	2000	4400	3600	8000	6400	55.00%	45.00%	64.00%	36.00%	4400	0
10000	2000	8000	2000	4000	2400	3600	6000	6400	40.00%	60.00%	64.00%	36.00%	3300	900
10000	2000	8000	3000	5000	1400	3600	5000	6400	28.00%	72.00%	64.00%	36.00%	2750	1350
10000	2000	8000	4000	6000	400	3600	4000	6400	10.00%	90.00%	64.00%	36.00%	2200	1800
15000	2000	13000	0	2000	7150	5850	13000	9150	55.00%	45.00%	61.00%	39.00%	7150	0
15000	2000	13000	2000	4000	5150	5850	11000	9150	46.82%	53.18%	61.00%	39.00%	6050	900
15000	2000	13000	3000	5000	4150	5850	10000	9150	41.50%	58.50%	61.00%	39.00%	5500	1350
15000	2000	13000	4000	6000	3150	5850	9000	9150	35.00%	65.00%	61.00%	39.00%	4950	1800
15000	2000	13000	5000	7000	2150	5850	8000	9150	26.88%	73.13%	61.00%	39.00%	4400	2250
15000	2000	13000	6000	8000	1150	5850	7000	9150	16.43%	83.57%	61.00%	39.00%	3850	2700
20000	2000	18000	0	2000	9900	8100	18000	11900	55.00%	45.00%	59.50%	40.50%	9900	0
20000	2000	18000	2000	4000	7900	8100	16000	11900	49.38%	50.63%	59.50%	40.50%	8800	900
20000	2000	18000	3000	5000	6900	8100	15000	11900	46.00%	54.00%	59.50%	40.50%	8250	1350
20000	2000	18000	4000	6000	5900	8100	14000	11900	42.14%	57.86%	59.50%	40.50%	7700	1800
20000	2000	18000	5000	7000	4900	8100	13000	11900	37.69%	62.31%	59.50%	40.50%	7150	2250
20000	2000	18000	6000	8000	3900	8100	12000	11900	32.50%	67.50%	59.50%	40.50%	6600	2700
20000	2000	18000	7000	9000	2900	8100	11000	11900	26.36%	73.64%	59.50%	40.50%	6050	3150
20000	2000	18000	8000	10000	1900	8100	10000	11900	19.00%	81.00%	59.50%	40.50%	5500	3600
25000	2000	23000	0	2000	12650	10350	23000	14650	55.00%	45.00%	58.60%	41.40%	12650	0
25000	2000	23000	2000	4000	10650	10350	21000	14650	50.71%	49.29%	58.60%	41.40%	11550	900
25000	2000	23000	3000	5000	9650	10350	20000	14650	48.25%	51.75%	58.60%	41.40%	11000	1350
25000	2000	23000	4000	6000	8650	10350	19000	14650	45.53%	54.47%	58.60%	41.40%	10450	1800
25000	2000	23000	5000	7000	7650	10350	18000	14650	42.50%	57.50%	58.60%	41.40%	9900	2250
25000	2000	23000	6000	8000	6650	10350	17000	14650	39.12%	60.88%	58.60%	41.40%	9350	2700
25000	2000	23000	7000	9000	5650	10350	16000	14650	35.31%	64.69%	58.60%	41.40%	8800	3150
25000	2000	23000	8000	10000	4650	10350	15000	14650	31.00%	69.00%	58.60%	41.40%	8250	3600
30000	2000	28000	0	2000	15400	12600	28000	17400	55.00%	45.00%	58.00%	42.00%	15400	0
30000	2000	28000	2000	4000	13400	12600	26000	17400	51.54%	48.46%	58.00%	42.00%	14300	900
30000	2000	28000	3000	5000	12400	12600	25000	17400	49.60%	50.40%	58.00%	42.00%	13750	1350
30000	2000	28000	4000	6000	11400	12600	24000	17400	47.50%	52.50%	58.00%	42.00%	13200	1800
30000	2000	28000	5000	7000	10400	12600	23000	17400	45.22%	54.78%	58.00%	42.00%	12650	2250
30000	2000	28000	6000	8000	9400	12600	22000	17400	42.73%	57.27%	58.00%	42.00%	12100	2700
30000	2000	28000	7000	9000	8400	12600	21000	17400	40.00%	60.00%	58.00%	42.00%	11550	3150
30000	2000	28000	8000	10000	7400	12600	20000	17400	37.00%	63.00%	58.00%	42.00%	11000	3600
35000	2000	33000	0	2000	18150	14850	33000	20150	55.00%	45.00%	57.57%	42.43%	18150	0
35000	2000	33000	2000	4000	16150	14850	31000	20150	52.10%	47.90%	57.57%	42.43%	17050	900
35000	2000	33000	3000	5000	15150	14850	30000	20150	50.50%	49.50%	57.57%	42.43%	16500	1350
35000	2000	33000	4000	6000	14150	14850	29000	20150	48.79%	51.21%	57.57%	42.43%	15950	1800
35000	2000	33000	5000	7000	13150	14850	28000	20150	46.96%	53.04%	57.57%	42.43%	15400	2250
35000	2000	33000	6000	8000	12150	14850	27000	20150	45.00%	55.00%	57.57%	42.43%	14850	2700
35000	2000	33000	7000	9000	11150	14850	26000	20150	42.88%	57.12%	57.57%	42.43%	14300	3150
35000	2000	33000	8000	10000	10150	14850	25000	20150	40.60%	59.40%	57.57%	42.43%	13750	3600
40000	2000	38000	0	2000	20900	17100	38000	22900	55.00%	45.00%	57.25%	42.75%	20900	0
40000	2000	38000	2000	4000	18900	17100	36000	22900	52.50%	47.50%	57.25%	42.75%	19800	900
40000	2000	38000	3000	5000	17900	17100	35000	22900	51.14%	48.86%	57.25%	42.75%	19250	1350
40000	2000	38000	4000	6000	16900	17100	34000	22900	49.71%	50.29%	57.25%	42.75%	18700	1800
40000	2000	38000	5000	7000	15900	17100	33000	22900	48.18%	51.82%	57.25%	42.75%	18150	2250
40000	2000	38000	6000	8000	14900	17100	32000	22900	46.56%	53.44%	57.25%	42.75%	17600	2700
40000	2000	38000	7000	9000	13900	17100	31000	22900	44.84%	55.16%	57.25%	42.75%	17050	3150
40000	2000	38000	8000	10000	12900	17100	30000	22900	43.00%	57.00%	57.25%	42.75%	16500	3600

2017 Herring Roe Quotas and Catches

Short Tons

Area	TAC	Roe SN		Roe GN		Roe Total	
		Quota	Catch	Quota	Catch	Quota	Catch
HG	0						
PRD	5,043	1,000	1,124	1,500	1,541	2,500	2,665
CC	n/a	215	0	n/a		215	0
SOG	36,652	13,013	9,695	15,172	10,166	28,185	19,861
WCVI	0						
Total	41,695	14,228	10,819	16,672	11,707	30,900	22,526